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Report on enhanced planning strategies and decision making for urban fringes, including land use scenarios for the case study Koper

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Contents

Abstract	3
1 Introduction	7
1.1 Context of the deliverable	7
1.2 Objectives of the deliverable	7
1.3 Structure of the deliverable	8
2 Materials and methods	9
2.1 Methodological approach	9
2.2 Strategies	9
2.3 Scenarios	10
2.4 Storylines for the Koper case study	11
2.4.1 Introduction about storylines for the Koper case study	11
2.4.2 General information about the meeting and the workshops	12
2.4.3 The storylines for the Koper case study defined on the meeting in March 2009	15
2.4.4 The storylines for the Koper case study defined on the workshop in May 2009	20
3 Results and discussion	31
3.1 Reflection of the MOLAND model results for the Business as Usual scenario on the strategies for the Koper case study	31
3.2 Reflection of the MOLAND model results for the Hyper Tech scenario on the strategies for the Koper case study	35
3.3 Reflection of the MOLAND model results for the Peak Oil scenario on the strategies for the Koper case study	40
3.4 The improvement of the strategies	44
4 Conclusions	48



Abstract

Partial results of the case study Koper from the different phases of the PLUREL project are interlinked and the latter are dependant on the previous ones.

In the present report three substantive issues defined in Joint Analysis Framework (JAF) remix for the Koper case study (i.e.: (1) land pressure due housing, (2) agriculture under pressure, and (3) high value nature at risk) are connected with the three strategies relevant for the same case study (i.e. (1) Land use efficiency and protection of the best agricultural land, (2) Green and recreational areas to increase quality of living, and (3) Rural Development Plan 2007-2013), with the assessment of these strategies and with the results of the MOLAND. Within the MOLAND, the local storylines based on the three chosen scenarios (Hyper tech, Peak Oil, and Business as Usual) have been used.

As the common weak point of the strategies in the Koper case study researchers have defined low stakeholders' involvement, especially in the case of the first two ones. Comparing the Koper case study strategies with those from other case studies some similarities with strategies from The Hague, Montpellier, Leipzig, and Manchester region can be observed.

Improved strategies in the Municipality of Koper need to include more participation of local actors in the planning process of local land use, a process of educating and informing people about the benefits of living near green spaces and raising their awareness of the need to take responsibility themselves for preserving green spaces, and the organization and maintenance of high quality educational and informative activities on various topics for all interested in rural development issues.

Objectives/aims

The general objective of this deliverable is to integrate partial results from the PLUREL case study Koper till now. As the first step in the PLUREL Module 3 process, stakeholders decided for the three main strategic issues in the case study, what is described in the deliverable D 3.2.1 (Figure 1). Based on this, the three strategies relevant for the Koper case study have been developed and described in the deliverable D 3.3.5 Assessment of the strategies has been made and presented in the deliverable M 3.3.12.

Regarding the land use issues, common general scenarios have been developed/defined in the PLUREL Module 1 (deliverable D 1.3.2). General scenarios have been translated to the land use in the case study as the storyline, which is described in the present report further on. The MOLAND model simulates land use in the Municipality of Koper in next two decades in the future taking into account the storylines (this is described in the deliverable D 2.4.2).

Present report is a reflexion on governance and land use issues reconnected with the research questions from Joint Analyses Framework Remix (JAF Remix) (i.e. deliverable D 3.2.1) regarding possible suggestions for the enhancement of the chosen strategies for the Koper case study.

Methodology



There are several methodologies used in the preparation of the report because the report itself has an integrative character. There is an integration of partial results from the different reports for the Koper case study in the frame of the PLUREL project. The final part is a reflection of researchers from the Koper case study of the MOLAND model results to the relevant strategies. Based on the literature review and comparison of strategies from the other PLUREL case studies in the deliverable D.3.3.8 (i.e. Governance patterns and performance of regional strategies; comparative analysis of seven studies in Europe and China) the researchers suggest some improving of existing strategies in the Koper case study.

Results / findings / conclusion

According to the MOLAND model results Business as Usual scenario will strongly impact the best agricultural land, so the strategy “Land use efficiency and protection of the best agricultural land” will not be very effective, except it will be incorporated earlier in the planning system (e.g. as zoning).

Because of declining of residential areas in the hinterland due to results of MOLAND for the Business as Usual scenario, there will be possibility for implementation of “Green and recreational areas to increase quality of living” strategy if they will incorporate hinterland areas in the green system of the town.

The Hyper Tech scenario will impact the coastal zone mainly, and the hinterland will stay less attractive for any kind of activities. This means that Rural Development Strategy 2007-2013 will hardly be implemented, since the strategy main idea is to increase environmental friendly tourism in connection with extensive farming system in the hinterland. Similar to the Business as Usual scenario, the Hyper Tech scenario will provoke more natural areas on to account of economic and residential areas in the hinterland. This is positive for the “Green and recreational areas to increase quality of living” strategy if they will incorporate in the city green system the above mentioned areas, as well. The predicted results from the MOLAND model are not very optimistic for the “Land use efficiency and protection of the best agricultural land” strategy. The best agricultural land is supposed to be used either for new built up areas either will be turned to natural areas. In the first case the land will be lost permanently. Although in the second case the land will not be lost permanently this will provoke decreasing of agriculture in the area and its weaker position in negotiating for land.

The results of the Peak Oil scenario are very promising for the “Rural Development Plan 2007-2013” strategy in the Koper region, because there will be enough natural resources to be implemented properly. On the other hand in this scenario the “Green and recreational areas to increase quality of living” strategy competes for the same natural resources as the previously mentioned strategy. But the scenario shows more positive results for the “Rural Development Plan 2007-2013” strategy. According to the “Land use efficiency and protection of the best agricultural land” strategy, this scenario shows the most positive results for it amongst the all three scenarios.

Improved strategies in the Municipality of Koper need to include: (1) de facto participation of local actors in the planning process of local land use, (2) a process of educating and informing people about the benefits of living near green spaces and raising their awareness of the need to take responsibility themselves for preserving green spaces and (3) the organization and maintenance of high quality educational and informative activities on various topics for all interested in rural development issues.

Popular science description of main results (max 300 words).

If the Koper region will follow the Business as Usual scenario, this will strongly impact the best agricultural land so the “Land use efficiency and protection of the best agricultural land” strategy will not be very effective, except it will be incorporated earlier in the

planning system (e.g. as zoning). Because of declining of residential areas in the hinterland, there will be possibility for implementation of the “Green and recreational areas to increase quality of living” strategy if they will incorporate hinterland areas in the green system of the town.

The Hyper Tech scenario will impact the coastal zone mainly and the hinterland will stay less attractive for any kind of activities. This means that the “Rural Development Plan 2007-2013” strategy will hardly be implemented since the strategy’s main idea is to increase environmental friendly tourism in connection with extensive farming system in the hinterland. The Hyper Tech scenario will provoke more natural areas on to account of economic and residential areas in the hinterland. This is positive for the “Green and recreational areas to increase quality of living” strategy if they will incorporate in the city green system the above mentioned areas as well. The best agricultural land is supposed to be used either for new built up areas either will be turned to natural areas.

The results of the Peak Oil scenario are very promising for the “Rural Development Plan 2007-2013” strategy in the Koper region, because there will be enough natural resources to be implemented properly.

Improved strategies in the Municipality of Koper need to include more participation of local actors, a process of educating and informing people about the benefits of living near green spaces, and organization and maintenance of high quality educational and informative activities on various topics for all interested in rural development.

Classification of results/outputs:

For the purpose of integrating the results of this deliverable into the PLUREL Explorer dissemination platform as fact sheets and associated documentation please classify the results in relation to spatial scale; DPSIR framework; land use issues; output indicators and knowledge type.

Spatial scale for results: Regional, national, European	regional
DPSIR framework: Driver, Pressure, State, Impact, Response	all
Land use issues covered: Housing, Traffic, Agriculture, Natural area, Water, Tourism/recreation	all
Scenario sensitivity: Are the products/outputs sensitive to Module 1 scenarios?	yes
Output indicators: Socio-economic & environmental external constraints; Land Use structure; RUR Metabolism; ECO-system integrity; Ecosystem Services; Socio-economic assessment Criteria; Decisions	Land Use structure, Decisions
Knowledge type: Narrative storylines; Response functions; GIS-based maps; Tables or charts; Handbooks	Narrative storylines
How many fact sheets will be derived from this deliverable:	1

1 Introduction

1.1 Context of the deliverable

Partial results of the case study Koper from the different phase of the project PLUREL are interlinked and the later are dependant on the previous ones.

As the first step in the PLUREL Module 3 process, stakeholders decided for the three main strategic issues in the case study: (1) land pressure due housing, (2) agriculture under pressure, and (3) high value nature at risk, what is described in the deliverable D.3.2.1 JAF Remix Analysis Framework (Figure 1), which represents a framework for research and spatial planning and governance strategies in Rural-Urban Regions to promote sustainability of rural-urban linkages.

The three strategies: (1) Land use efficiency and protection of the best agricultural land, (2) Green and recreational areas to increase quality of living, and (3) Rural Development Plan 2007-2013), relevant for the Koper case study have been developed and described in the deliverable D 3.3.5 Analysis of Regional Planning and Decision-Making Strategies and their Impact on Land Use in the Urban Fringe – Case Study KOPER. Assessment of the strategies has been made and presented in the deliverable M 3.3.12 Assessment Report – Assessment of Regional Strategies – KOPER Case Study, Slovenia.

Regarding the land use issues, common general scenarios have been developed/defined in the PLUREL Module 1 (deliverable D 1.3.2). General scenarios have been translated to the land use in the case study as the storylines, which are described in the present report further on. The MOLAND model simulates land use in the Municipality of Koper in next two decades in the future, taking into account the storylines (this is described in the deliverable D 2.4.2 Land use projections based on MOLAND Output Koper Test Case).

1.2 Objectives of the deliverable

The general objective of this deliverable is to integrate partial results from the PLUREL case study Koper till now. The present report is a synthesis of results on governance and land use issues; reflection of land use modelling under different scenarios on the chosen strategise for the case study Koper, reconnected with research questions from JAF remix: Analyses Framework (D 3.2.1) regarding possible suggestions for enhancement of the chosen strategies.

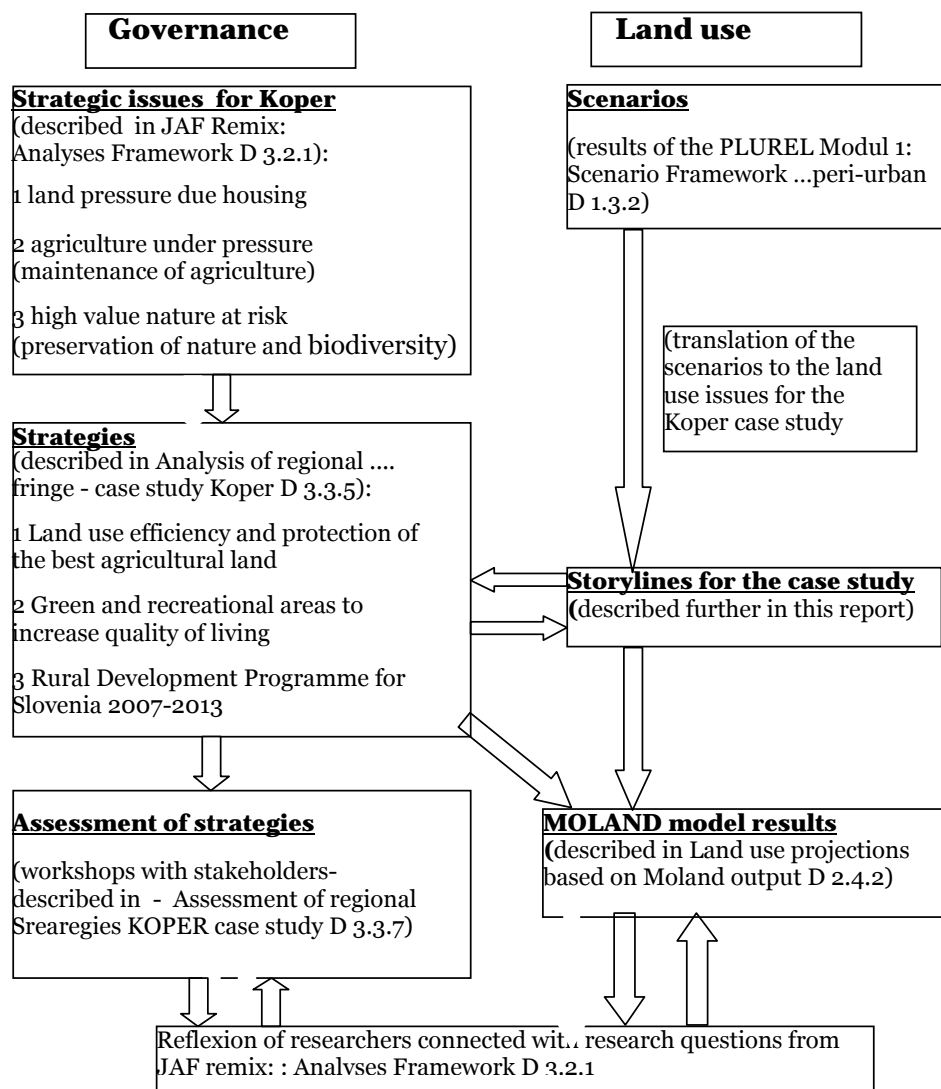


Figure 1: Position of the actual deliverable in the PLUREL context

1.3 Structure of the deliverable

Beside description of the chosen strategies, short description of the chosen scenarios is presented, as well. Local storylines which are described in the continuation of the deliverable come from two different events. The first is the meeting between stakeholders employed at the Municipality of Koper and the MOLAND modellers in March 2009 and was crucial for the further modelling process. The second is the workshop (in two days) with bigger group of stakeholders from the Koper case study. As the modelling process for the Koper case study has been almost finished in that time, the storyline formation has more exercising character. But because of very active stakeholders, the results from the workshop are abundant and are presented in this report, as well.

Based on the literature review and comparison of strategies from the other PLUREL case studies in the deliverable D.3.3.8 (i.e. Governance patterns and performance of regional strategies; comparative analysis of seven studies in Europe and China) the researchers suggest some improving of existing strategies in the Koper case study.

Finally, reflections of the MOLAND model results in the chosen strategies for the Koper case study are presented.

2 Materials and methods

2.1 Methodological approach

The present report has an integrative character. For better understanding of the whole process, there is a short description of strategies and scenarios, relevant for the case study; even they have been presented already in some previous deliverables. Results of the meeting during the PLUREL General Assembly in Koper in March 2009 and of the workshops with stakeholders in Koper on 21th and 28th of May 2009, where they decided for the storylines, are incorporated in the storyline description chapter, where methodology for designing of the storylines is described in details, as well.

We accompanied maps from the MOLAND model report for the Koper case study with the strategies and find the reflection.

Further on, we compared the results from other PLUREL case studies in the deliverable D.3.3.8 (i.e. Governance patterns and performance of regional strategies; comparative analysis of seven studies in Europe and China) and from the literature to propose some enhancement in the regional spatial development strategies in the Koper case study.

2.2 Strategies

Strategies to cope with three main land use issues in the Municipality of Koper (i.e. (1) land pressure due housing, (2) agriculture under pressure, and (3) high value nature at risk) to which the MOLAND model results should be reflected are briefly described below:

1 “Land use efficiency and protection of the best agricultural land”

The pressures of urbanization have caused the sealing and destruction of quality agricultural land in the peri-urban area. Suburbanization and individual house construction along main roads have diminished land use efficiency and caused a decrease in agricultural production. A clear and science-based policy on spatial development and land use should provide a tool for the preservation of valuable agricultural land and production capabilities as well as define rules for resolving disputes between different land use needs.

In Slovenia, in spatial plans of the state and of local communities, agricultural land is divided in two categories: agricultural land of the best quality and other agricultural land. The evidence data are linked to the base of the land cadastre. As the Act of spatial planning has indicated already, the existing system of land evaluation in Slovenia is not relevant. Recent expert recognitions show that soil characteristics are not the only parameter which determines production potential and consequently economical potential of agricultural land. Suitability (e.g. land exposition) of the land for certain agricultural production, availability of agricultural infrastructure, possibility of carrying out of a certain economically sound agricultural production, accessibility of agricultural plots, and isolation from pollution sources, are very important factors, as well.

Due to above mentioned, the existing agricultural land categorization should be changed or upgraded. Soil quality, specific suitability of agricultural land for a certain agricultural branch, possibility of introduction of new production type (e.g. sustainable and ecological production), and some other parameters, which importantly influence agricultural land productivity, should be taken into account. This, much higher complexity of the categorization should be diversified additionally by spatial criteria and in cases of special agricultural branches even in production areas (i.e. districts or any differently defined spatial regions).

2 “Green and recreational areas to increase quality of living”

Urban sprawling and unorganized spatial development have produced a state in which green and recreational areas are scarce and do not provide an adequate quality of living in the peri-urban area. Roadside construction and lack of organized settlements centers make it difficult to plan and allocate green areas, thus diminishing the quality of living. Recognizing the importance of such areas and their integration in the spatial planning process is essential to guarantee a higher living standard of the population in the peri-urban area. The aim is to research the benefits of green areas and to create a policy on green area allocation.

3 “Rural Development Plan 2007-2013”

Tourism and recreation connected with agriculture should be stimulated, because of traditional cultural area quality and attractiveness, what is a result of prevailing agricultural land use in rural areas in the past. For this purpose, maintaining of the traditional land use, as well as alternative agriculture will be stimulated, especially in the areas of exceptional landscape, in the whole coastal hinterland and in other areas already protected or designated for protection as natural values. Within this, the principle of sustainable management with renewable natural resources, maintaining of the cultural landscape and environment protection should be stressed.

In the rural settlements with agro-tourism, possibilities for farm enlargement for overnight accommodation capacities, and for other supplemental farm activities in connection with tourism will be assured.

Important question is, how to steer the development of Istrian countryside that the area will keep to be settled, that the abandoned houses will be renovated, that overgrown terraces will be cultivated again, that new infrastructure will be established in a way to enable contemporary way of life, and together with the development of tourism, and other environmental friendly activities will enable dwellers additional income.

2.3 Scenarios

Three scenarios, briefly described below, and described in details in the deliverable D.1.3.2 (Scenario Framework ...peri-urban), have been run for the Koper case study (Mubareka, 2009):

1 The **Hyper Tech** scenario is characterised by very high economic growth. The population is described as reaching a peak growth and the decline after 2020. There is no building within this scenario, with few (if any) zoning restrictions in order to emphasize absence of planning.

Additional amendments to this scenario for the Koper case study are:

- Economically driven plan with concentration on the tourism sector. Increase in hotels and associated infrastructure.
- Decrease in zoning of natural areas near coastline.
- Decrease in zoning for built up classes; building is unrestricted.
- Port grows inland
- Roads: New access to port; new highway to Izola and selected variant for the motorway from Koper to Dragonja
- Rail: New access to the port; railway to Trieste
- Various: Seeds planted by municipality for new infrastructure.

2 The **Peak Oil** scenario is characterised by a society whose priorities are in services and informatics rather than industry and production (as in the A1 scenario). Emphasis is placed on social issues and environmental sustainability. As is the case for the A1 scenario, the population is described as reaching a peak growth and the decline after 2020. Building is restricted using strong zoning restrictions within this scenario.

Additional amendments to this scenario for the Koper case study are:

- Emphasis on protection of natural resources
- Respect soil fertility classification and Natura 2000 as zoned for no building
- Economic incentives to agriculture sector; growth of this sector in hinterland
- Eco-tourism emphasizes attractiveness of natural areas and inland areas
- Densification within the areas of the port but port does not spread
- Encouragement of housing in hinterland, relieve pressure on coastline
- Rail: branching rail of hinterland to Koper; Koper to Izola

3 The **Business as Usual** scenario is run in order to test the calibration robustness and to eventually tweak the trends observed for the calibration period. Two sources were used in the set up of the BAU scenario: (1) National trends for the past decade and (2) future projections according to Eurostat and national statistics bureau.

When MOLAND model has been applied for the Koper case-study some specifics of the area has been taken into account (Perpar *et al.* (2008), cited by Mubareka (2009):

- There is a historical city center where development is limited
- The peri-urban fringe to this historical center is dynamic and currently undergoing massive change
- Because of its location, there is competition for the best agricultural land between the agricultural sector and building.
- More than one third of the municipality are Natura 2000 areas.
- The peri-urban area has diverse land use and large vacant areas
- The municipality is Slovenia's outlet to the sea. There is a port which occupies a significant land mass and economic role in the municipality as well as country
- The main bulk of the municipality consists of rural hinterland whereby inhabitants are struggling to conserve the way of life of time ago; this is encouraged by economic incentives

2.4 Storylines for the Koper case study

2.4.1 Introduction about storylines for the Koper case study

In the PLUREL Analysis Report for Koper case study (D 3.3.5) history of land use, present land use, planning system in Slovenia, actors and their strategies regarding the development in Koper peri-urban area and selected three strategies (i.e. Land use efficiency and protection of the best agricultural land, Green and recreational areas to increase quality of living, and Rural Development Plan 2007-2013) are described more in depth. Later on in Assessment Report for Koper case study these strategies are assessed

with the respect to their performance and governance. Scenarios are the next step and this paper is a result of the workshops between stakeholders and researchers (including MOLAND researchers) where the storylines for each individual scenario were developed as well.

2.4.2 General information about the meeting and the workshops

Due to the research timetable and availability of MOLAND modelling people during the PLUREL General Assembly in Koper (March 2009) scenarios and storylines for Koper case study has been discussed and defined in two ways (what has not been the case in the other PLUREL project case studies):

- On the meeting between the stakeholders from the Municipality of Koper, researchers from the University of Ljubljana and MOLAND modellers during the General Assembly in Koper in March 2009. On this meeting, scenarios for Koper have been chosen and storylines for Koper defined in general as well. After this meeting MOLAND people started to work on modelling for Koper case study and further discussion and adjustments were taken as well.
- Two workshops with bigger group of stakeholders were organized in May 2009. Scenarios has been chosen already before as it is described above, so more emphasis has been directed to the selected scenarios for MOLAND modelling, but stakeholders expressed their wish to discuss about the rest two scenarios as well.

Workshop with stakeholders has been performed on May 21st and May 28th 2009 and twelve participants were presented: 8 practitioners and 4 researchers. The list of the participants is available at the research institution.

Workshop participants came from different institution involved directly or indirectly in the spatial planning or important actors and space users in the Municipality of Koper:

- Municipality of Koper (Office of Environment and Spatial Planning, Office of Economy, Office of Local Self-Management)
- Forestry Institute of the Republic of Slovenia
- Regional Development Agency
- Institute of the Republic of Slovenia for Nature Protection
- Agricultural Advisory Service
- University of Ljubljana, Biotechnical Faculty

On the first workshop in May we presented firstly how the project is going on, we presented selected strategies for Koper case study and all in PLUREL Module 1 prepared scenarios, and described the general presumptions for each scenario. General idea and purpose of MOLAND modelling has been described, as well.

For the warming up of the discussion, we asked workshop's participants firstly to describe a present situation in the Municipality of Koper from economic, social and environmental point of view, because they know the situation very well, so it was easier for them later to discuss, what can happen in the future if some of the selected scenario will happen.

Discussion about the selected scenarios went upon already before prepared scheme in the following steps:

- The definition of driving forces, pressures, states, impacts and responses for the selected Hyper-Tech and Peak-Oil scenarios for the selected three sectors: housing, agriculture and biodiversity.
- Discussion about the storylines behind the selected Hyper-Tech and Peak-Oil scenarios from economic, demographic and environmental point of view and what can be the result of individual scenario on the land use change.
- Discussion about the storylines has been later directed to the effects of each individual scenario reflected in sectors as housing, agriculture, tourism, biodiversity, transport and industry & services.

- In the next step we tried to get stakeholder's views about the possible land use change, if some of the selected scenario will happen: for each scenario in first case if the three selected strategies for the Koper case study will be implemented and in the second case if the strategies will not be implemented.
- At the end of the workshop stakeholders discussed about the possible storylines behind the two not selected scenarios (Green Enclaves and Extreme Water).

SCENARIOS DEFINITION FOR MOLAND MODELING

“A scenario is defined as a story that can be told in both words and numbers, offering an internally consistent and plausible explanation of how events unfold over time (Gallopín et al., 1997 in Kok and van Delden, 2007). Scenarios are about envisioning future pathways and accounting for critical uncertainties” (Figure 2) (Francisco Escobar).

Regional demographic, economic, transport and land claims divisions

Koper has been subdivided into regions in order to study the impact of growth in one region on other regions. Each region has its own model which interacts with its neighbouring region (Figure 3).

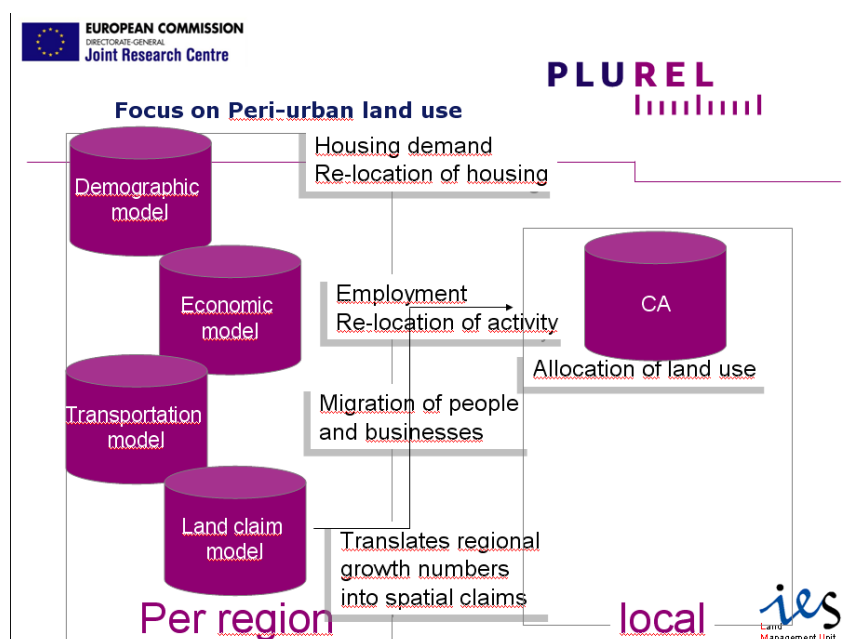


Figure 2. An overview of the MOLAND model with respect to how regional differences are taken into consideration (source: Francesco Escobar).

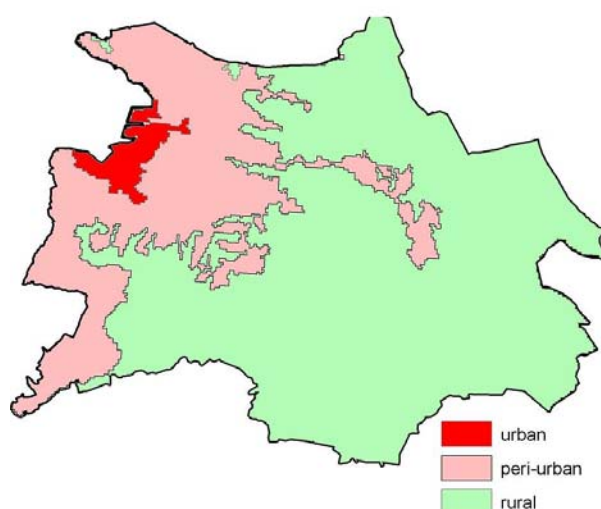


Figure 3: Rural-Urban-Region (RUR) typology divisions for Koper, created within PLUREL's Module 2.

2.4.3 The storylines for the Koper case study defined on the meeting in March 2009

Scenarios and the Koper case-study specific conditions

The development of land use scenarios for rural-urban regions in Europe, thus enhancing the understanding of driving forces for land use changes, is among the seven objectives outlined for PLUREL. Module 1 of the PLUREL project has the mandate to create scenarios for modelling.

For the Koper case study, we have established two scenarios which are in-line with the PLUREL scenarios (i.e. Hyper-Tech scenario and Peak-Oil scenario), but vary slightly according to the wishes, expressed by the Koper stakeholders on the meeting in March 2009. The third scenario is a baseline for comparison of these scenarios and is called Business as Usual (Table 1).

Table 1: A description of the PLUREL scenarios to be run for the Koper case-study and the case-study specific conditions (defined on the meeting between stakeholders and MOLAND modelers in March 2009)

Scenario name	PLUREL general description	Case-study-specific conditions
Hyper-Tech (A1)	<ul style="list-style-type: none"> ▪ Rapid economic growth ▪ Polycentric urbanization: new residential developments ▪ New transport investment ▪ Decline in energy prices lead to increase in industry and production ▪ Passive management leading to densification of urban areas and peri-urbanization 	<ul style="list-style-type: none"> ▪ Economic sector of concentration is tourism ▪ Increased pressure on the coastal areas ▪ Specific transportation plans to be determined ▪ Specific building plans to be determined ▪ Building unrestricted in terms of housing and economic sectors ▪ Port expanded and density increases
Peak-Oil (B1)	<ul style="list-style-type: none"> ▪ Environmental and social consciousness ▪ Increased density of urban centre ▪ Decreased use of cars due to high oil prices 	<ul style="list-style-type: none"> ▪ Building restricted ▪ Relieve pressure on coastline by encouraging building in hinterland (i.e. increased number of work places at home) ▪ Shift of economic activity towards tourism and agriculture ▪ Tourism sector emphasized natural attractions ▪ Port density increases, but not expanded
Business-as-Usual (BAU)	Prolongation of the trends witnessed in the changes in land use maps	<ul style="list-style-type: none"> ▪ Preservation of natural and agricultural land based on strict defined criteria ▪ Strong pressure on land – high demand for stand alone housing ▪ Coastline somewhat protected ▪ Tourism increasing ▪ Competition for coastal lands between 3 sectors: tourism, agriculture, housing and port

In the next step, the storylines for the Koper case study were translated into rules for the MOLAND model (Table 2-4).

Table 2: The Hyper-Tech scenario: Rapid economic growth due to technological alternatives to energy sources – translation of the scenario storyline for the Koper case study into rules for the MOLAND model (defined on the meeting between stakeholders and MOLAND modelers in March 2009)

Theme	Description	Translated in the MOLAND model
Storyline / trends	<i>Society characterised by advances in technology and technological solutions for energy shortage</i>	
Demographics	Increase in peri-urban population and consequently on housing demand	Block and residential housing is favoured on city outskirts as well as coastline; building of individual housing is not restrained.
Economic trends	<ul style="list-style-type: none"> - Focus on tourism - Port capacity increases and diversifies with introduction of passenger traffic 	<ul style="list-style-type: none"> -Specific infrastructure is built (i.e. football stadiums). Associated infrastructure appears: Hotels, services and commercial activities -Port density increases and expands
Urbanization/ Spatial planning Transport	<p>No particular constraints,</p> <p>Increase demand for transport networks, roads and rail between major urban centres</p>	<p>CA model can act upon rule set and put little emphasis on zoning and suitability</p> <p>Peri-urbanization of rural areas and increased access to coastal areas</p>

Table 3: The Peak Oil scenario: Environmental and social consciousness due to increasing energy prices – translation of the scenario storyline for the Koper case study into rules for the MOLAND model (defined on the meeting between stakeholders and MOLAND modelers in March 2009)

Theme	Description	Translated in the MOLAND model
Storyline / trends	<i>Increase in energy prices result in global approach to sustainable development</i>	
Demographics	Discourage sprawl	Densification of already urbanized areas is favoured
Economic trends	Increase in promotion of agricultural products (wine and olive oil) with economic incentives for farmers	Increase in permanent crops and protection of existing permanent crops.
	Tourism sector focuses on natural attractions	Improvement of actual tourist attractions such as marina
	Highly restricted building	Building restrictions by Natura 2000 and soil fertility classification protecting best agricultural land
Urbanization/ Spatial planning	Encouragement of green areas	Encourage green belts & parks; bicycle paths and housing near workplace
Transport	Decreased demand of roads from peri-urban areas to urban areas; increase demand on public transportation	Increase bike paths; public transportation network.

Table 4: The Business as Usual scenario – translation of the scenario storyline for the Koper case study into rules for the MOLAND model. The current situation overview is based on land use changes from 2000 to 2007:

Theme	Description	Indicator	Calibration data trend
Demographics	Population in urban centre are transient (ie. students)	Rental housing Less spending in downtown area? Night life? (more an agent-based issue)	No evident signs
	Population in sub-urban area tend to be more permanent Migration from inland to coast	Increase in housing demand on city outskirts Temporal population dens mapping	Significant increase in individual housing (25%) converted from , pasture and permanent crop Small increase in block housing (2%) Large increase in residence buildings (58%) Small decrease in urban (3%) Suburbanization of municipality
	Moderate immigration Steady moderate growth	GDP	Decrease in agricultural land but increase in port area and infrastructure / public utilities
Economic trends	Leading sector 1: tourism	Main employer is services sector	Increase in marine area
	Leading sector 2: marine transport	Marine transport gross wt of goods (tons) / port area (km2)	Increase in port area
	Energy production sector on the rise Sectors experiencing cuts: industry & agriculture	Employment in industry & agriculture sectors	Sharp increase in infrastructure and public utilities (65%) Decrease in arable land cover Decrease in permanent crop cover Decrease in pasture Increase in forest cover: forest replaces arable, permanent crop and pasture Increase in infrastructure/pub utilities, converted from pasture and perm crop (65%) Small decrease in cont urban (3%)
Urbanization/ Spatial planning	Encouraging individual housing	Number of individual houses	Individual houses are favoured, have fewer restrictions and have a high affinity for roads
	Moderate protection by Natura 2000, best agricultural	Areas zoned out with moderate protection (less protection for	N/A

	land	tourist industry)	
	Few or no services or commerce in these “dormitory” villages	Fragmentation of individual houses	No relationship between housing and services and commerce. No particular affinity of services or commerce to housing
	Linear development of housing with no distinct centre offering services	Even density of individual houses along roadside	Presence of houses along roadside
	Port expanding off shore	Past trend (measure surface area increase from 2000 to 2007)	Large increase in port area (30%), mainly converted pasture and water
Transport	Increasing road network: (new highway from inland; impending hwy to Isola)	Regional/ national plans	Transport network increased from 2000 to 2007 with the addition of the new highway

2.4.4 The storylines for the Koper case study defined on the workshop in May 2009

2.4.4.1 Description of the present situation in the Municipality of Koper

For the warming up of the discussion, workshop's participants have been asked to discuss about the present situation (a present situation mean the Business as Usual scenario in the MOLAND modelling) in the Municipality of Koper from the different viewpoints:

- a) Economic situation,
- b) Social situation,
- c) Environmental situation,
- d) Spatial development,
- e) Traffic situation,
- f) Situation in the tourism and real estate sector.

- a) Present economic situation in the Municipality of Koper:** recession, as a global problem, has influence on the economic situation in the municipality as well. One of the consequences is increasing number of unemployed people, which lead people also to think about how to use their resources, like agricultural land, to survive or have additional income. People from the Agricultural Advisory Service described experiences that more agricultural land owners came to them to ask how they can use their agricultural land again for self-supply or even for market production. In the discussion it was expressed, as well that theory of never-ending economic growth is under the big question.
- b) Present social situation in the Municipality of Koper:** recession give rise to social distress on one side and on higher level of self-supply on the other side. This situation express more also the feeling of exclusiveness from the society, especially for the unemployed people, what can mean on the other side also more criminal and worst security in the society. But on the other side there is also better feeling for the wider society; food production and use of agricultural land for food production become more moral obligation for land use owners again.
- c) Present environmental situation in the Municipality of Koper:** environmental awareness increasing on the basis of expressed environmental problems and pollution, there is more interest on efficient spatial development and protection of natural sources i.e. natural areas and best agricultural land on the other side. There are also some disappointments of individuals because of the actual local and national environmental and spatial planning policy, which put requirements of society above wishes of individuals (i.e. that they can not build where-ever they would like to). Positive is on the other side receiving of environmental standards i.e. waste water cleaning, better waste management, water quality improvement etc.
- d) Present spatial development situation in the Municipality of Koper:** in the municipality there is a high pressure on agricultural land with the intention of land use change for highway and other road construction, housing, golf playgrounds, deposit for different material (construction material, salt soil etc.). Also natural areas and natural worth are exposed to pressure. There are many interventions in the space, especially because of the big interest of investors to built new apartments on attractive locations. There are also many other expressed problems like crumbled land and ownership of land, abandoned village centres and some houses on the countryside, influence of globalization (concentration of services, shops etc. near the city), increased traffic because of the port, tourism development, opened borders between Slovenia and Italy cause additional pressures, there are some adequate policies (i.e. appropriate tax policy on property) missing etc. On the other side establishment of the University of Primorska in Koper some years ago influenced on the development of the area, area has more development perspective and there is also

big interest for investment because of the strategic location, port, tourism possibilities, nearness of Italian and Croatian border etc.

- e) **Present traffic situation in the Municipality of Koper:** fast increase of traffic is evident, as well as in air pollution, particularly in the concentration of the ozone in the air (often even above the acceptable level) and increased level of benzene and dusty parts in the air. These are also the results of bad organized public transport in the region and mostly use of individual cars for transport needs. Local government does not put big attention to organize public transport better and on the other side people don't change their behavior. Increased activity of the port lead to additional problems before all the tracks from port have to drive through the city, the solution will be the new entrance to the port directly from the highway which is on the construction. Present traffic sample (mostly use of individual cars) demand construction of new parking places and roads.
- f) **Present situation in tourism and real estate sector in the Municipality of Koper:** real estate is still good business although recession affected it as well in last year. Areas is attractive for living and spending holidays, so also investors are interested to build new apartments. Because of not very effective inspections there is even more decrease of green areas on the account of built-up area in the municipality although green areas are defined in plans, but investors increase built-up areas to increase their profit. There is already surplus of the apartments in the area, more of them are empty, but there is still interest to built new ones. In the peri-urban area there are some natural worths interesting for tourism and leisure activities but there is no appropriate attention to them in spatial planning.

2.4.4.2 Description of the storylines for the Hyper-Tech and the Peak Oil scenario in the Municipality of Koper (defined on the workshops in May 2009)

Discussion about the storylines on the workshop has been focused more detailed on two already before selected scenarios for the MOLAND modelling (Hyper-Tech and Peak Oil) but participants wanted to discuss about the rest two scenarios as well (Green enclaves and Extreme Water).

a) Storyline for the Hyper-Tech scenario

Upon participant's opinion already the development till now has been pretty uncontrolled and these is presumption also for the "Hyper-Tech" scenario where is expecting that population situation will be still worse (population becoming old) what mean that also services and other support environment will need to be adopted more to the older population.

Big transformations are expected: Port of Koper will spread to the Rižana river valley as also in the rural hinterland. There will be more expressed in-migration and consequently a need to concentrate the activities in peri-urban areas on the best quality agricultural land. Increase of tourism and holiday's capacities and secondary houses are the presumptions also.

From the social viewpoint apartments will be mostly rented and the population will be more temporary (in-migration due to work places) and as a result there will be less renovations of the apartments, building etc., particularly in the old city centre. In-migrations will have as a consequence that old residents will search for the new solutions which will be mostly in the construction of new individual houses in the peri-urban area.

b) Storyline for the Peak Oil scenario

Upon the workshop participant's opinion, "Peak Oil" scenario force people more in the local supply with agricultural products. Agricultural land is more appreciated and protected as non-return natural source. Because of the peoples' awareness production technologies will be more environmental oriented. Increased demand for healthy food will increase interest for farming among farmers and other land owners as well as for the protection of land. Some new technologies will be needed if some pesticides will be prohibited.

From the demographic point of view more stable situation is expected, consequently there won't be so much pressure on the environment also.

c) Storyline for the Green Enclaves scenario

From the economic viewpoint lower and slowly economic growth is expected, but on the other side with higher quality of living. There will be some re-orientation of the agriculture according with natural conditions: arable land will be reserved for plant production (fruits, vegetable, field crops), areas on slopes for vineyards, while animal production will base on pastures. More knowledge of biology and biotechnology and better technological solutions in agriculture will be needed.

Number of inhabitants in the municipality in this case would probably decrease, almost no in-migration is expected.

In this case environmental awareness will increase and also better care for the environment is presumed. Biodiversity will be high. More efforts for the development of the "biological" protection for plants against diseases and pests for the decreasing of damages will be needed. Situation will require more rational use of water resources. There will be less transport and industry but more services.

d) Storyline for the Extreme Water scenario

Negative influences of natural catastrophes are expected as well as higher damages on buildings, infrastructure, agricultural products, cars etc. It means much more expensive assurances, more expensive technologies and their development and higher food prices.

Such possible situation would have negative influences on demography also, number of inhabitants would decrease.

From the environmental point of view such situation would demand more attention to planning with searching for the places protected from wind, not flooded areas etc. Use of more appropriate construction materials would be needed (for example straw roofs against the hail). There would be need for more rational use of natural resources (land, water, etc.).

From the land use change viewpoint it would be necessary to take into the account that some areas are more flood endangered and that along the rivers, streams are not built-up areas but pastures, while vineyards and other permanent plantations are in more protected areas. Often floods and high waters would need other land use what mean still less available space for the urbanization. Such situation would need to take into the account historical memory and more considered land use. More attention would be necessary for water storage for the water supply and for the irrigation.

2.4.4.3 Driving forces, pressures, state, impacts and reactions (DPSIR matrix) for scenarios defined on the workshop with stakeholders in Koper in May 2009

According three main issues for the Koper case study (land pressure due housing, agriculture under pressure, and high value nature at risk) stakeholders on the workshops in May 2009 filled DPSIR matrix for each of above mentioned issue for the selected Hyper-Tech (Tables 5-7) and Peak Oil scenario (Tables 8-10).

Table 5: DPSIR matrix for the Hyper-Tech scenario for the Land pressure due housing substantial issue for the Koper case study (defined by the stakeholders on the workshop in May 2009)

	Issue: HOUSING - Hyper-Tech scenario
DRIVING FORCES	<ul style="list-style-type: none"> - In-migrations - Increasing economic power and GDP - Concentrated capital - Attractiveness of the area
PRESSURES	<ul style="list-style-type: none"> - Capital pressure - Needs for new apartments
SITUATION	<ul style="list-style-type: none"> - Number of immigrants/year - Number of tourist's spending nights/year - Number of new building permissions
INFLUENCES	<ul style="list-style-type: none"> - Higher prices of real estate, built-up land - Construction of new marinas - Lost of agricultural land - Less green areas, lower quality of life - Decline of biodiversity - More transport - Increased use of water and energy
REACTIONS	<ul style="list-style-type: none"> - Out-migration - Increased health problems - More criminality (i.e. area could be less attractive for living) - More casinos (negative influence on local society) - More suicides (i.e. area could be less attractive for living) - "Industrialization of agriculture on one side and abandonment on the other side

Table 6: DPSIR matrix for the Hyper-Tech scenario for the Agriculture under pressure substantial issue for the Koper case study (defined by the stakeholders on the workshop in May 2009)

	Issue: AGRICULTURE - Hyper-Tech scenario
DRIVING FORCES	<ul style="list-style-type: none"> - Decreased areas for agriculture - Concentrated capital
PRESSURES	<ul style="list-style-type: none"> - Price of agricultural products (trade networks-pressure to decrease of producers prices) - Pressures on transport
SITUATION	<ul style="list-style-type: none"> - Decline of food quality - Decreased number of farmers - Decreasing of prices of agricultural products (trade chains make pressure)
INFLUENCES	<ul style="list-style-type: none"> - Worse food quality - Agriculture make more pollution of environment
REACTIONS	<ul style="list-style-type: none"> - New technologies in food production - "Industrialization" of agriculture

Table 7: DPSIR matrix for the Hyper-Tech scenario for High value nature at risk substantial issue for the Koper case study (defined by the stakeholders on the workshop in May 2009)

	Issue: HIGH VALUE NATURE - Hyper-Tech scenario
DRIVING FORCES	<ul style="list-style-type: none"> - Increase of emissions, - Pressures on space, - Technologies of intensive agriculture and industry
PRESSURES	<ul style="list-style-type: none"> - More people, more visits of natural areas, natural reserves...
SITUATION	<ul style="list-style-type: none"> - Polluted environment - Degradation - Experiences Devaluation of space
INFLUENCES	<ul style="list-style-type: none"> - Lost of individual species and biodiversity (big monoculture plantations, lost of mosaic landscape) - Built-up areas goes also on natural maintained areas
REACTIONS	<ul style="list-style-type: none"> - More sharp regimes and control - More conflicts because of the pressure in space (it is difficult to adjust the pressures at present legislation) - Invasion of species from abroad - Fragmentariness and decline of biodiversity

Table 8: DPSIR matrix for the Peak-Oil scenario for the Land pressure due housing substantial issue for the Koper case study (defined by the stakeholders on the workshop in May 2009)

	Issue: HOUSING - Peak Oil scenario
DRIVING FORCES	<ul style="list-style-type: none"> - Price of energy sources - Environmental awareness - System of moral worth
PRESSURES	<ul style="list-style-type: none"> - increased needs for the renovation of old buildings
SITUATION	<ul style="list-style-type: none"> - more renovations of existing building fund - Less new constructions, less new built-up land needed
INFLUENCES	<ul style="list-style-type: none"> - less transport - Logistics more on local level - Maintenance of more green areas - Decreasing pressure on agricultural land and peri-urban area
REACTIONS	<ul style="list-style-type: none"> - better organized public transport - Better managed settlements - More efficient use of sources - Use of alternative energy sources - More lively city and village centres

Table 9: DPSIR matrix for the Peak-Oil scenario for Agriculture under pressure substantial issue for the Koper case study (defined by stakeholders on workshop in May 2009)

	Issue: AGRICULTURE - Peak Oil scenario
DRIVING FORCES	<ul style="list-style-type: none"> - demand for local agricultural products and quality food - Public opinion and awareness - State policy
PRESSURES	<ul style="list-style-type: none"> - more land for agricultural production - Prices of agricultural products
SITUATION	<ul style="list-style-type: none"> - increased available land for agricultural production, farming also for self-sufficiency, - Less abandoned land, less overgrowing of agricultural land - More local products on market
INFLUENCES	<ul style="list-style-type: none"> - influence on landscape image - Less negative influences on environment - Positive influence on biodiversity - More possibilities for experiences tourism, farm tourism, biodiversity etc.
REACTIONS	<ul style="list-style-type: none"> - local supply reduce transport needs - Higher offer of local products - Searching for “environmental more friendly” technologies - More diversified agriculture (mosaic structure in landscape)

Table 10: DPSIR matrix for the Peak-Oil scenario for High value nature at risk substantial issue for the Koper case study (defined by stakeholders on workshop in May 2009)

	Issue: HIGH VALUE NATURE - Peak Oil scenario
DRIVING FORCES	<ul style="list-style-type: none"> - Change of needs and worth - Public opinion (more green areas) - Energy price
PRESSURES	<ul style="list-style-type: none"> - Public opinion - Efficient use of energy (i.e. wind energy) - Food prices and demand
SITUATION	<ul style="list-style-type: none"> - Maintenance of biodiversity and even increase
INFLUENCES	-
REACTIONS	<ul style="list-style-type: none"> - More visits of natural areas - More alternative ways of tourism (photo tourism, hunting, etc.) - More time spend in natural areas - Better health condition and psycho-physical condition of inhabitants - Less social problems (and needs for social supports)

2.4.4.5 Storylines for the Hyper-Tech and the Peak-Oil scenario defined on the workshops with stakeholders for the Koper case study in May 2009

Stakeholders on the workshop in May 2009 have been asked to describe storylines for the Hyper-Tech and Peak-Oil scenario from economic, demographic, environmental and land use change viewpoint (Table 11) and storylines for the selected scenarios by housing, agriculture, tourism, biodiversity, and industry/services sector (Table 12).

Table 11: Storylines for the Hyper-Tech and the Peak-Oil scenario for the Koper case study from economic, demographic, environmental and land use change viewpoint (defined by the stakeholders on the workshop in May 2009)

	Hyper-Tech	Peak-Oil
ECONOMIC VIEWPOINT	<ul style="list-style-type: none"> - Strengthen role of University of Primorska - Development of tourism: more tourist accommodations, activities and accommodations for elderly people - Not limited economic development come to the point where economy pull down - Fast technological development, globalization, further strengthen of Port of Koper and transport sector - Cooperation of port of 	<ul style="list-style-type: none"> - Globalization is under the question? - More finances for social supports - More economic farming, more “environment friendly” technologies, - Strengthen of North Adriatic ports, international trade is in decrease - Tourism focuses on short distance destinations (radius of 500 km with very important tourist markets) - University contribute to answer on some problems - Strengthen of urban centres

	Koper and port of Trieste, further growth of port, port is still more important	
DEMOGRAPHIC VIEWPOINT	<ul style="list-style-type: none"> - social infrastructure (schools, kindergartens, etc.) do not follow to the needs - Immigrants are already disturbing factor - Worst health situation (also pandemic diseases) - Aging population - Decrease of population (till 2020 autochthonous population will decrease in any case) - In-migration (because of work and university) 	<ul style="list-style-type: none"> - Less in-migration and migrations inside the municipality - Lower demographic pressure - More children
ENVIRONMENTAL VIEWPOINT	<ul style="list-style-type: none"> - higher burdening of environment - Despite input to improve environment final result is negative, because of fast development quality decrease - Demolishment of environment - Supplementing of infrastructure for management with waste and water cleaning - More clear relation between nature protection and other sectors 	<ul style="list-style-type: none"> - Infrastructure has been installed in time of cheap oil price - it is possible to maintain this infrastructure in new conditions or even invest in new environmental infrastructure
LAND USE CHANGE	<ul style="list-style-type: none"> - society is not prepared for such fast development-not legislation and also not spatial planning - Agricultural land is endangered, especially in peri-urban area (bigger complexes), in hinterland they are more dispersed, - Construction of new neighbourhoods (investors) – i.e. Villas with view on the sea – bigger spatial interventions 	<ul style="list-style-type: none"> - Lower pressure on space - On micro level-advantage of city and not of dispersed settlement - Social infrastructure in advantage - Lower pressure on infrastructure -

Table 12: Storylines for the selected scenarios by sector for the Hyper-Tech and the Peak-Oil scenario for the Koper case (defined by the stakeholders on the workshop in May 2009)

	Hyper-Tech	Peak-Oil
HOUSING	<ul style="list-style-type: none"> - need for more apartments, new houses and infrastructure - more land use change 	<ul style="list-style-type: none"> - searching for solutions in existing available free built-up land and buildings, more renovations
AGRICULTURE	<ul style="list-style-type: none"> - decreased agricultural land, agriculture more hobby activity 	<ul style="list-style-type: none"> - strengthen of agriculture, it is also a survival strategy, more local products, local supply on local markets instead longer transport needs
TOURISM	<ul style="list-style-type: none"> - Conditions can be good for the development of tourism, tourists will visit Koper on cruising, there will be new constructed island on the sea to increase the coast area and make it more attractive 	<ul style="list-style-type: none"> - strengthen of tourism on short distances, development of innovative ways (photo tourism, “green” tourism, more attention to domestic tourists, more adopted offer, integration of agriculture, local traditions and heritage and tourism
BIODIVERSITY	<ul style="list-style-type: none"> - lost of biodiversity on one side, on the other it can contribute to increase-less intensive agriculture mean more meadows, less polluted water sources etc. 	<ul style="list-style-type: none"> - biodiversity can be increased with different agricultural activities and production, production of local products can be very diversified -
TRANSPORT	<ul style="list-style-type: none"> - More transport needed, increased port mean also mean more tracks etc., there will be more cars and cars will be also bigger ones 	<ul style="list-style-type: none"> - transport needs will decreased for about 30% because of the oil price and more local supply -
INDUSTRY & SERVICES	<ul style="list-style-type: none"> - increased development of new industry and services, - need for more land use change for new industrial areas 	<ul style="list-style-type: none"> - some industry will fall in ruins but there will be more development of services and micro enterprises which will used available buildings

2.4.4.6 *Scenarios with or without selected strategies for the Koper case study defined on the workshop with the stakeholders in May 2009*

Participants of the workshop have been asked also to think about what influence could have each of the three selected strategies for the Koper case study in each individual selected scenario if strategy would be implemented and if not. The results of the discussion are presented in the tables below (Tables 13-15).

Table 13: The influence of implementation of the Land use efficiency and protection of best agricultural land strategy in the Hyper-Tech and Peak-Oil scenario for the Koper case (defined by the stakeholders on the workshop in May 2009)

	Hyper-Tech	Peak-Oil
WITH THE STRATEGY IMPLEMENTED	<ul style="list-style-type: none"> - Less lost agricultural land - More conflicts - More biodiversity - High pressure of traffic - Limited economic development - Well considered investments - Higher pressure on other areas and land - More dispersed settlement - Less problems on all spheres - Less land use change - High pressure of capital - POSITIVE: protection of agricultural land - NEGATIVE: more pollution from transport, more spread settlement pattern 	<ul style="list-style-type: none"> - More efficiency on all spheres - Interest of investors is in the direction of higher efficiency because of smaller costs

Without strategy: best quality agricultural land will be built-up and non-renewable natural resource will be lost for ever, dispersed type of settlement will need more expensive infrastructure, also environmental consequences will be more negative.

Table 14: The influence of implementation of the Green and recreational areas for better quality of living strategy in the Hyper-Tech and Peak-Oil scenario for the Koper case (defined by stakeholders on workshop in May 2009)

	Hyper-Tech	Peak-Oil
WITH THE STRATEGY IMPLEMENTED	<ul style="list-style-type: none"> - Fundamentally enough of money - Higher quality of living - There is a need to define appropriate proportion of green and built-up areas - Less lost land - Advantages for settlement development - More pressure on the peri-urban area 	<ul style="list-style-type: none"> - Less interventions in the peri-urban areas - More attention to management with existing natural resources - People not travel so much, are more at home, so green areas are still more important in nearness of their homes to increase a quality of living

Without strategy: absence of green and recreational force people travelling. This is more expensive and with negative influences for the environment.

Table 15: The influence of implementation of the Rural Development Programme for Slovenia 2007-2013 strategy in the Hyper-Tech and Peak-Oil scenario for the Koper case (defined by the stakeholders on the workshop in May 2009)

	Hyper-Tech	Peak-Oil
WITH THE STRATEGY IMPLEMENTED (programme already existing as also financing of the measures)	<ul style="list-style-type: none"> - Less of economic interest, - Programme would not be successful in the conditions of this scenario, - Fast development is destroying for the environment, - No effect because activities exclude each other and are not accordant. 	<ul style="list-style-type: none"> - Important big support for rural areas, - Programme can be upgraded with other policies measures and initiatives.

Without strategy: without strategy there is no rural development very likely.

3 Results and discussion

3.1 Reflection of the MOLAND model results for the Business as Usual scenario on the strategies for the Koper case study

For the Business as Usual scenario, the main changes are in individual housing, services and the port area. The port area is foreseen to expand northeast; the services increase in the peri-urban area; the individual houses are abandoned in some rural areas but not all, and are foreseen to increase along the Bertoki-Gračišče main road from Koper center to the hinterland (Figure 4).

Strategy 1 “Land use efficiency and protection of the best agricultural land” exposed as one of problems suburbanisation and individual house construction along main roads what have diminished land use efficiency and cause a decrease in agricultural production. And from this fact there is a need for scientific based policy on spatial development where preservation of valuable agricultural land will be incorporated in a process of planning.

The communities in the Municipality of Koper are affected differently by the Business as Usual scenario in 2025, according to the MOLAND projections. The residential area grows in five communes but remains stable in most. There is a decrease in residences in seven communes. As far as economic activity is concerned, its increase is mainly prevalent in the communes where residential areas are on the decline. Where economic and residential areas decline in 2025, natural areas take over (figure 5).

According to strategy “Green and recreational areas to increase quality of living”, the second strategy of the Municipality of Koper, green system of the settlement involves green areas of the settlement, water areas and areas aside water, agricultural land and forest areas will be included. Especially in the town hinterland, the possibility of simultaneous purpose of recreational areas with agricultural and forest areas should be turned to advantage.

According to results of the Business as Usual scenario, there will be more natural areas in some communities in the Koper hinterland, due to declining of residential areas. If they would like to organize this abandoned areas as areas for increasing quality of leaving because of their recreational or green function, this areas should be incorporated in the green system of the town.

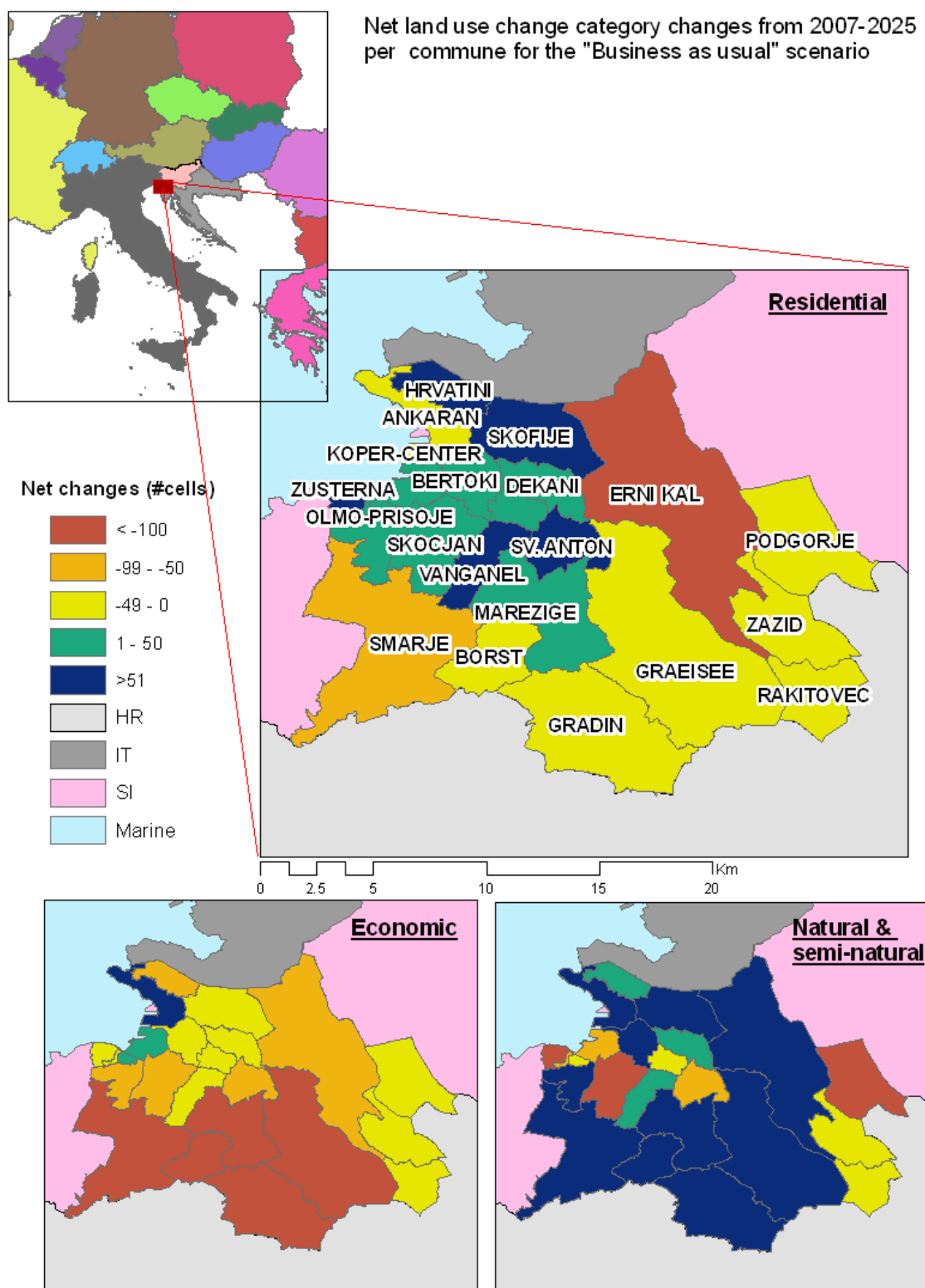


Figure 5: An overview of the trends in residential, economic and natural and semi-natural land use classes at a commune level for the Business as Usual scenario projections for 2025 for the Koper case study. HR, IT and SI stand for Croatia, Italy and Slovenia, respectively.

According to the results of the Business as Usual scenario, the main soil type competed for among the three land use categories is the richest soil. This makes sense since the economic interest includes the agricultural sector. Residential areas increase in the best soil categories, as shown in figure 6.

As protection of the best agricultural land is very important strategy in Koper (as in the whole Slovenia) this results ring an alarm bell, because they show that the most fertile soil will be allocated for the residential areas, what is far away from what Slovenia (and Municipality of Koper as part of it) would like to achieve.

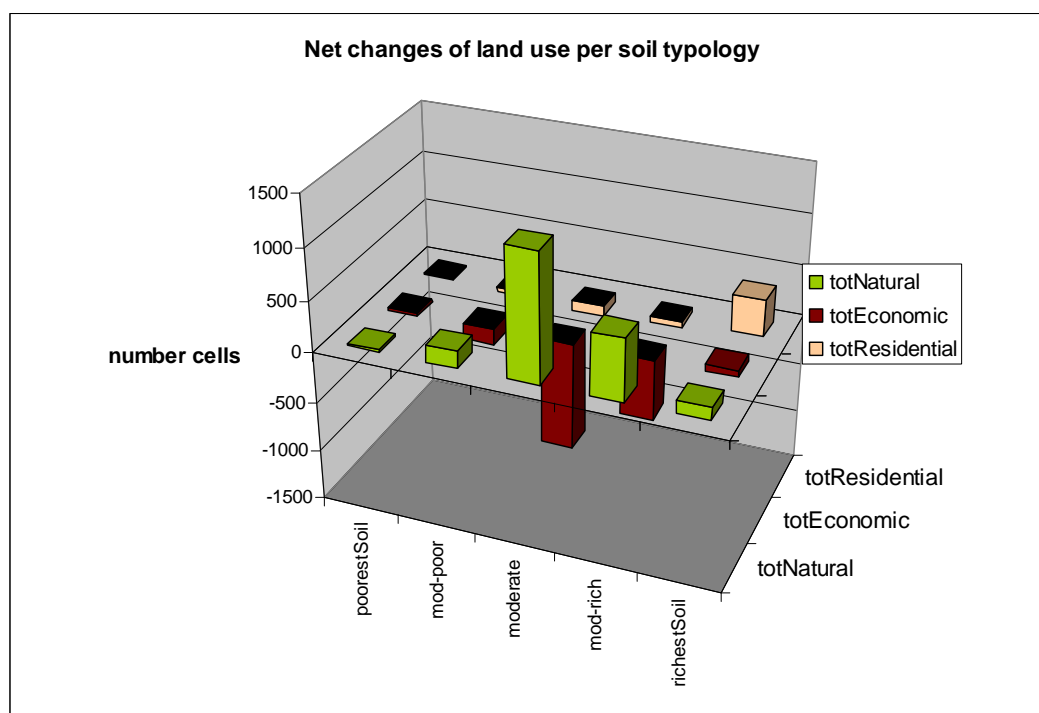


Figure 6. The net changes of land use categories per soil type for the Koper case study

3.2 Reflection of the MOLAND model results for the Hyper Tech scenario on the strategies for the Koper case study

The main differences in the Hyper Tech scenario from the Business as Usual scenario are related to the seeds, which were implemented (e.g. sport complex, industrial park, marina, public swimming pool). The leisure green, commercial and tourist attraction classes were altered by seeds. The impact on the area concerned and surrounding the “forced growth” of these classes is shown in figure 7.

Rural development Plan 2007-2013 as the third strategy of the Municipality of Koper try to increase environmental friendly tourism in the town hinterland, connected with cultural landscape, managed with not intensive agriculture. For this purpose they intend to stimulate an alternative agriculture, especially in the areas of exceptional landscape. Agro-tourism includes overnight accommodation capacities and some other farm activities serving for non invasive tourism. The results for the Hyper Tech scenario show totally opposite development for this branch. Very intensive and highly natural resources demanded (water) tourism will be mostly concentrated on the coastal zone.

Differences in selected land use classes from 2007 - 2025

Hyper tech scenario

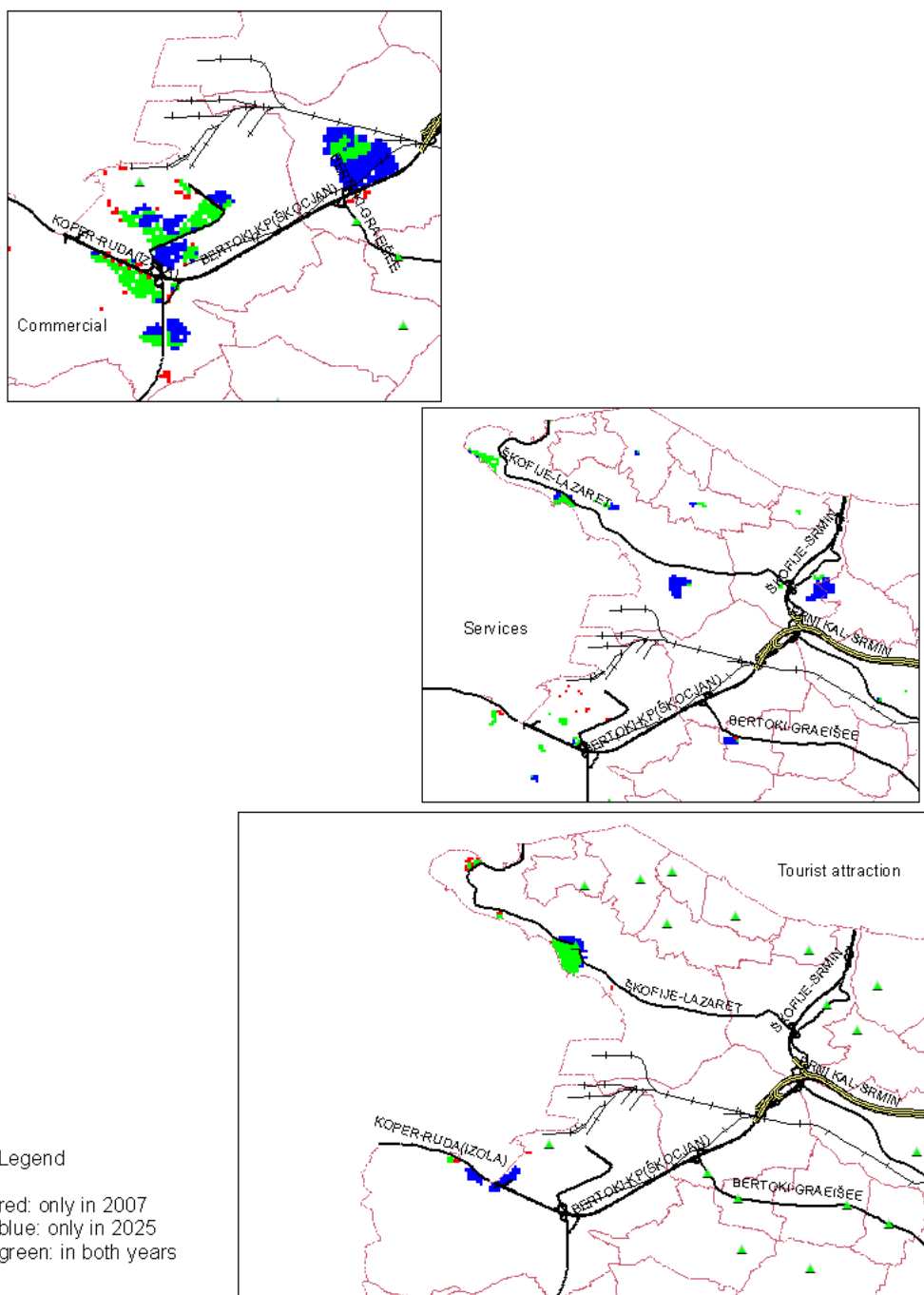


Figure 7. The differences in land use between 2007 and 2025 for the Hyper Tech scenario for three land use classes: commercial, services and tourist attraction for the Koper case study.

At a community level, as shown in figure 8, changes occur in all communities. In terms of residential activity, there is an important increase in Škofije and Hrvatini on the Italian border while Črni Kal experiences a decrease in residential activity. From an economic perspective, several communities undergo a slight increase, including rural communities. Šmarje is an exception to these trends: this community experiences an increase in natural and semi-natural land use classes, and a decrease in economic and residential activities. The simulated construction of the new marina and the sports facilities impacts the associated communities on the coast.

Reflection here is similar to that at BAU according to strategy “Green and recreational areas to increase quality of living”. Also within this scenario declined economic and residential areas in communities, natural areas will take over. The process within this scenario is present in even more communities as in BAU scenario. On the other hand increased residential activities in some other communities would call for more quality of living. This can be achieved with “Green and recreational areas to increase quality of living” strategy implementing that in green system of the settlement agricultural land and forest in the hinterland play an important role as well.

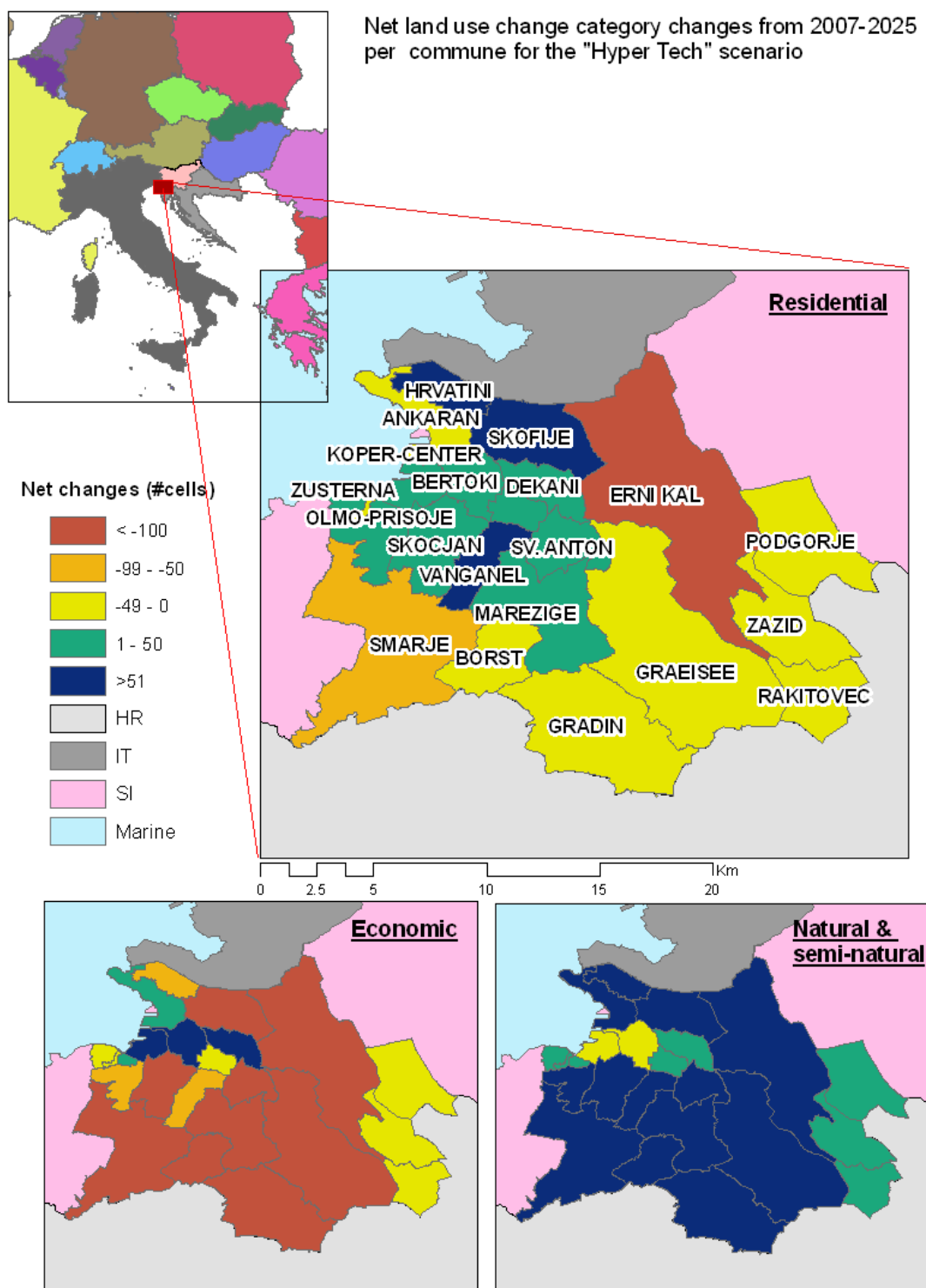


Figure 8: An overview of the trends in residential, economic and natural and semi-natural land use classes at a commune level for the Hyper-Tech scenario projections for 2025 for the Koper case study. HR, IT and SI stand for Croatia, Italy and Slovenia, respectively.

As figure 9 shows, there is competition for the richest soil between the natural land use and the residential land use categories. The natural land use category dominates the moderate to rich soil categories.

According to the strategy “Land use efficiency and protection of the best agricultural land” this results are ambiguous. The best agricultural land would be used for residential what means the permanent loss of this natural resource. On the other hand, having green land use on the best agricultural soil would mean that this natural resource is temporally used for another purpose but at least theoretically could be used for agriculture again. According to the strategy “Rural development Plan 2007-2013” this are very negative results because agriculture will lost (although not permanently) the most important natural resource. The consequence will be weaker agriculture as an economic category what will mirror in less progressive rural development as well.

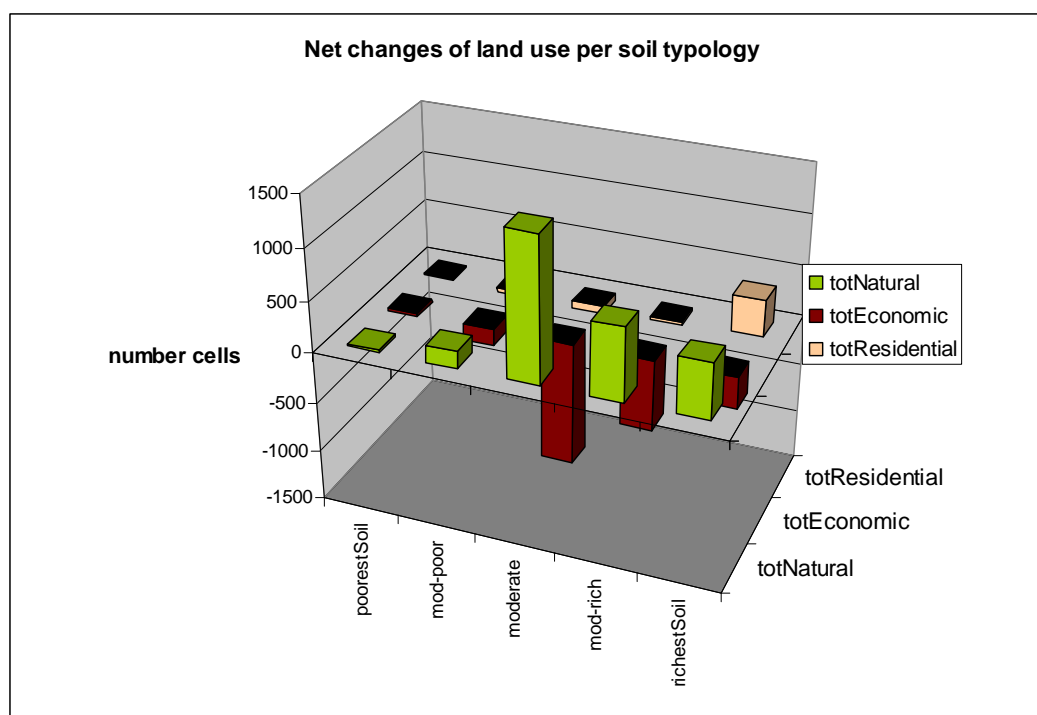


Figure 9: The land use category changes per soil type for the 2025 projections according to the Hyper Tech scenario for the Koper case study.

3.3 Reflection of the MOLAND model results for the Peak Oil scenario on the strategies for the Koper case study

The main feature that characterizes the peak oil scenario is the growth in the agriculture sector. There is notable increase in permanent crop land use class. This affects the location of individual houses and services. These two classes remain intact and grow in the rural hinterland as a result of maintaining incentives for growing permanent crops. In addition to this, new tourist attractions crop up in the heart of the agricultural land (Figure 10). This does not occur for the other two scenarios.

According to “Rural development Plan 2007-2013” this are very prominent results, as the strategy put a lot of efforts in developing not intensive agriculture connected with tourism in the hinterland. Obviously potentials of natural and cultural heritage for abundant living and working environment will be appropriately exploited.

From this level of the results we do not know where the detailed locations of individual housing are and how much the best agricultural soil are affected with the urbanisation. Reflection to the “Land use efficiency and protection of the best agricultural land” in this step is not possible yet.

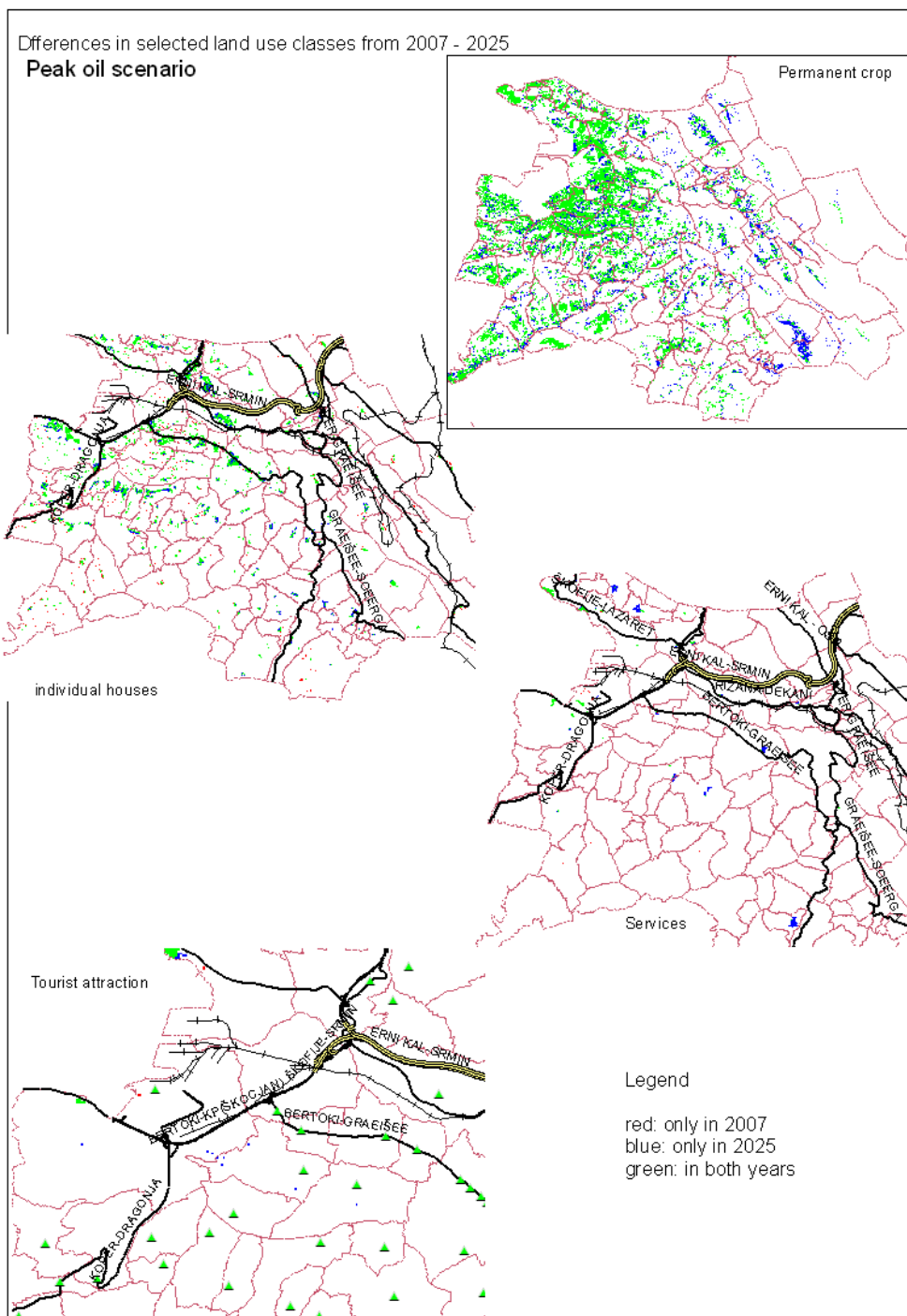


Figure 10: The differences in land use between 2007 and 2025 for the Peak Oil scenario for four land use classes: permanent crop, individual houses, services and tourist attraction for the Koper case study.

The net increase in the permanent crop class predominantly benefits Koper's rural areas. Črni Kal and Gračišče are significantly impacted by this scenario for the economic land use category at the price of their natural and semi-natural land use classes. Areas with significant residential activity increases are Škofije and Gračišče (Figure 11).

The "Rural development plan 2007-2013" strategy would be very easy implemented and would be very effective according to these results. On the other hand the "Green and recreational areas to increase quality of living" strategy would not be very promising, because there is a decrease of green and natural land use, especially in the hinterland and not so much in urban areas (e.g. Koper, Ankaran, etc.). But situation is not as pessimistic as there is some common point for both of the strategies. Namely both of them mentioned "recreation or not invasive tourism connected with not intensive agriculture" is in the Koper hinterland.

As mentioned before, we could not say anything about the "Land use efficiency and protection of the best agricultural land" strategy.

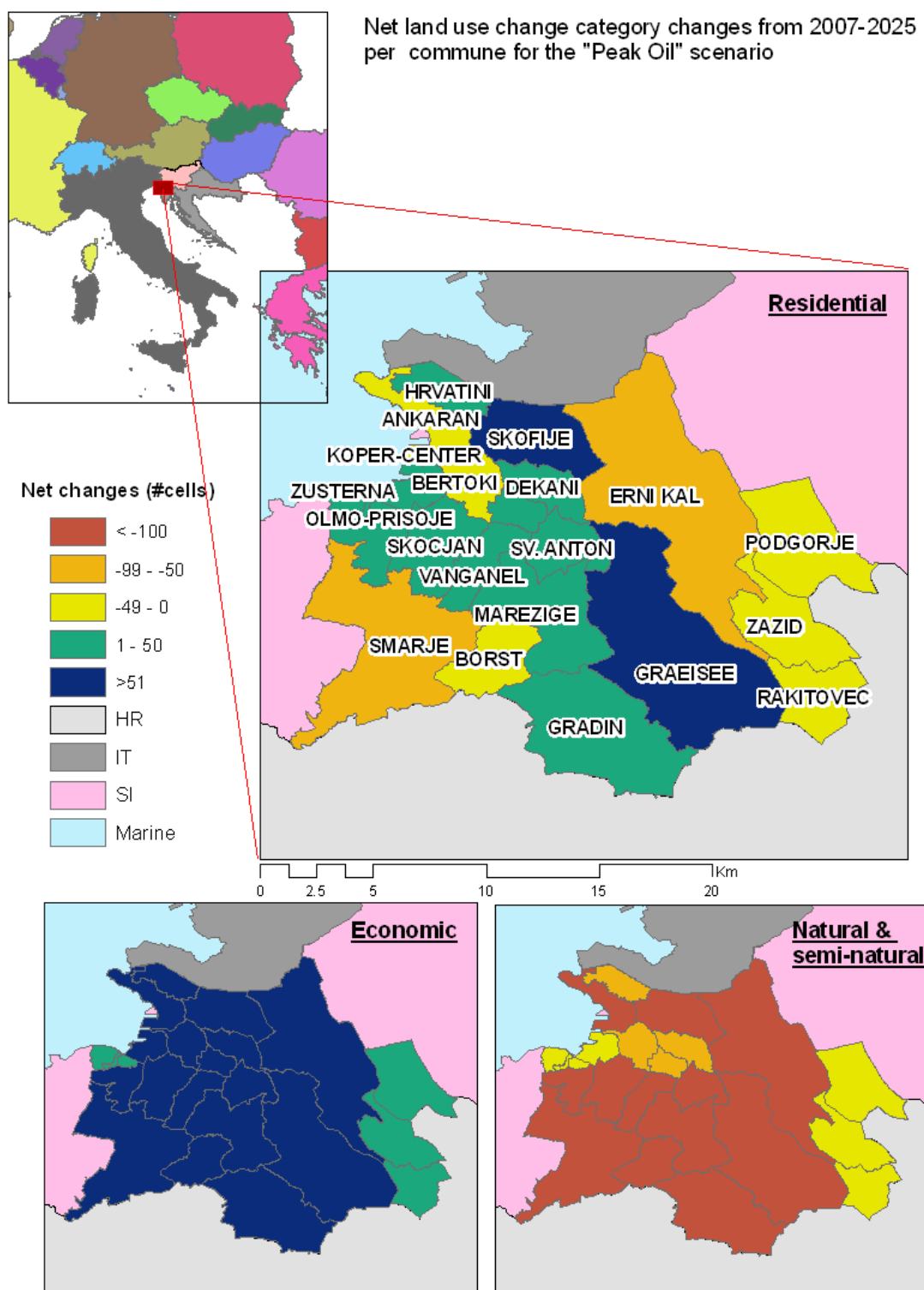


Figure 11: The overview of trends for the Peak Oil scenario on a community level per land use category for the Koper case study. HR, IT and SI stand for Croatia, Italy and Slovenia, respectively.

The main change in occupation of the three top richest soil categories is within the economic sector (Figure 12). This occurs at the expense of natural land use classes.

As we know that in this scenario agriculture is somehow strong economic sector this results show that the best agricultural land is used by it. In a mean time, there is really minimal change in the residential land use. These results are the most appropriate among all for the “Land use efficiency and protection of the best agricultural land” strategy.

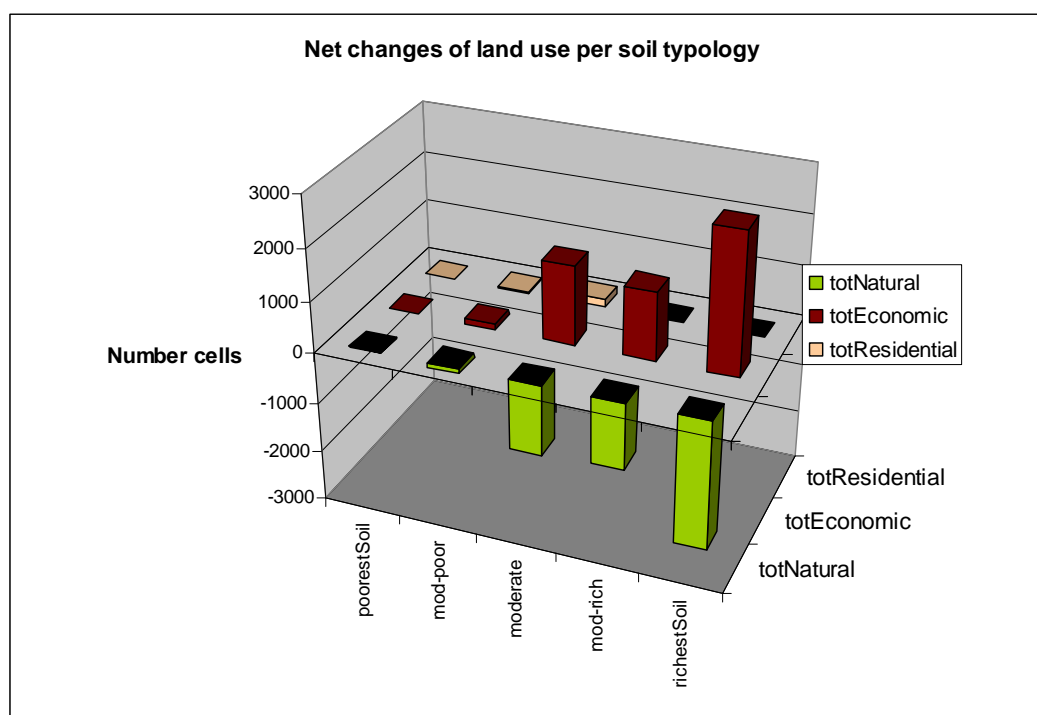


Figure 12: The land use category changes per soil type for the 2025 projections according to the Peak Oil scenario for the Koper case study.

3.4 The improvement of the strategies

“Land use efficiency and protection of the best agricultural land”

According to scientific and technical knowledge the existing system of land evaluation and the existing agricultural land categorisation in Slovenia (agricultural land of the best quality and other agricultural land) is not appropriate. They should be modified and upgraded. The more strict criteria should be defined to change the designation of the best agricultural land, especially there, where the basic infrastructure required for intensive agricultural production is already built. Furthermore, the agricultural land with high and good soil production potential for agricultural land use should be defined as the best agricultural land. Measures for updating and intensification of agricultural production or land recovery need to be implemented too. In the preparations of Municipality Space Plane of Koper these scientific and technical recommendations are considered as well as other existing legislation documents (e.g. the Law of Spatial Planning 2007).

Taking into account the fact that scientific and technical knowledge could be just one part - the priority issues of the strategy, it also needs to contain other elements, particularly

well defined procedures and actors involved in its implementation. In this regard, the basic issue who and how would exercise the power and authority in decision-making and implementing the protection of the best agricultural land. Ample evidence from the literature of different disciplines (law, business, ecology, political and international studies, anthropology, biology, sociology, anthropology, and other fields) on environment governance shows that today the state is not anymore the singly appropriate player to exercise power and authority in environmental decision-making (Reed & Bruyneel 2010). European Commission's White Paper on Governance (2001), the report by the Mandelkern Group on Better Regulation (2001) and EU directives (Water Framework Directive (2000/60/EC) and the Public Participation Directive (2003/35/EC)) are good examples of the new trend of extended stakeholder involvement in environmental governance (Newig and Fritsch 2009). The state has been reconfigured and 'hollowed out', with the redistribution of state functions upwards (to international and transnational institutions), downwards (to state/provincial/regional and local authorities), and outwards (to non-state actors) (Bulkeley, 2005). This implies "the existence of overlapping competencies among multiple levels of governance and the interaction of political actors across those levels" (Marks et al. 1996: 41).

As recent researches (Norman and Bakker, 2009, Lebel et al. 2008, Harrington et al. 2008, Lurie and Hibbard's 2008: quoted by Reed and Bruyneel 2010) show by these multiscale processes the state roles are altered, but they are not necessarily diminished. They also show that contrary to expectations, local capacity for governance has not increased, despite supposed reductions in the role of the state. This happened not due to the lack of civic engagement, but for the lack of sufficient financial and other key supports. Reed and Bruyneel (2010) also found that borders between nations, between sub-national jurisdictions, hindrances in communication between stakeholder groups (veto players) in decision-making processes and wider society, and between disciplines continue to act as barriers to the meaningful involvement of non-state and local actors in environmental governance.

However, environmental policy in Europe and elsewhere as a response to a lack of its effectiveness is pushing forward more collaborative forms of governance in the sense that 'public participation is not an end in itself but a tool to achieve the environmental objectives of the directives' (EU, 2002, p. 6, quoted by Newig and Fritsch 2009). In the case of Koper Municipality above mentioned evidences and facts mean that effective protection of the best agricultural land in this as in any other region is not just a matter of the state regulation activities underpinned by scientific expertise, but a matter of endeavours and competences of local population in partnership with municipality officers, various actors from economic sphere and NGOs. As some experiences from different parts of the world tell, e.g. Landcare in Australia (Wallington & Lawrence 2008) for successful stories of environment governance local actors need to take over a responsibility for their environment which is possible only through deliberation and reflection accompanied with continuous process of decision-making about land issues. In this regard, the improved strategy needs to include de facto participation of local actors (of various professional backgrounds) in the planning process of local land use. They need to have a full access to express and discuss their initiatives with various professionals engaged in land planning and conservation and to take active part in the process of decision-making. All changes in the space of the area need to be publicly presented and confronted among different interests groups. In order to equip the local actors with the knowledge of land protection value good information and education program needs to be settled too. With a good knowledge in land protection local actors can take over full responsibility for land use and also a controlling function of the state inspection. Through these activities and learning process local actors can gradually gain skills and capacities in taking part in environmental governance.

The main idea of this strategy is closed to the idea of "Density Building" strategy from Montpellier with the main difference that in Montpellier they have incorporated also the traffic strategy what is not a case in Koper (Aalbers and Eckerberg, 2010).

“Green and recreational areas to increase quality of living”

The main objectives of this strategy is to create a green system in Koper Municipality including water areas, areas aside water, agricultural land and forest areas. With conservation and recreational areas management the ratio between urban and natural areas is intend to be maintained. Green and open areas, crucial for the green system of the town in ecological and social sense should have priority before other intrusions into the space.

So far this strategy was not implemented successfully in the Koper Municipality. In spite of existing official norms integrated into the Municipality Space Plan which claim that at building areas certain share of green area is obligatory to be preserved the maintenance of green areas especially at the new constructions is failed. Due to insufficient state control – the lack of its inspection efficiency – the interests of construction enterprises to extend their activities over the land kept for green areas and even off the record constructions accomplished by some locals are very often carried out. This phenomenon is a consequence of unsuccessful environmental policy that is still mainly in the domain of the state. Thus, as in the case of agricultural land protection strategy here multi level environmental governance should also be implied. In this regard the Municipality Koper should get much stronger authority over the control of green areas (i.e. urban green space and natural areas in the surrounding countryside) on its territory and set up its own control service.

Besides official authorities, as in any other case, the best sources of green area protection are local people who are aware of the importance of these areas for their quality of life and willing to actively participate in their maintenance. Much of the academic literature on people and landscape in this respect reveals that interaction with land brings benefits to individuals and communities, but also that attitudes and perceptions of people towards landscape are place-specific (Swanwick, 2009); dependent to their everyday experiences with the land. Today only a relative small proportion of the population, including farmers, own or actively manage land. The vast majority of the public become increasingly separated from direct involvement with the land itself. However, the great majority of the population nowadays ‘consume’ land by actively gaining access to it for recreation or more passively by simple enjoyment of the everyday surroundings (parks, green spaces) if available. It has been explored e.g. for England (Pretty, 2003, Pretty and Smith, 2004, quoted by Swanwick, 2009) that dwelling nearby greenspace brings social benefits, particularly for the maintenance of social capital; living near parks and gardens provide feeling of ‘togetherness’ among the people. The awareness of the benefits of good urban and rural green spaces for the well being of the population inspired many sustainable community initiatives in the US and England to promote ‘green infrastructure approach’¹ (Benedict and McMahon, 2002). It rests among others on the principle of being a critical public investment (like any other infrastructure) and of being composed by alliances and relationships between public and private organizations; it engages key partners and involves large number of stakeholders with diverse backgrounds and needs. Furthermore, research (Parker et al., 2008, quoted by Swanwick, 2009) showed that environmental values are a strong determinant of people’s attitudes to change in the landscape of protected landscape and consequently to their behaviour. There have been reviews of how

¹ The Green Infrastructure Work Group formed by The Conservation Fund and the USDA Forest Service in 1999 developed the following definition for green infrastructure: ‘Green infrastructure is our nation’s natural life support system - an interconnected network of waterways, wetlands, woodlands, wildlife habitats and other natural areas; greenways, parks and other conservation lands; working farms, ranches and forests; and wilderness and other open spaces that support native species, maintain natural ecological processes, sustain air and water resources and contribute to the health and quality of life for America’s communities and people’ (Benedict and McMahon, 2002: 12).

attitudes to nature and landscape may be influenced by the media and by environmental education. It has been found (Pooley and O'Connor, 2000, quoted by Swanwick, 2009) that environmental education aimed at changing attitudes (and ultimately it is hoped behaviour) should emphasise people's emotions and beliefs at least as much as their environmental knowledge.

Considering the above listed findings the strategy of the Municipality Koper considering green spaces should contain the elements of public involvements too. The policy makers of the Municipality Koper should encourage local people to participate in caring for green space through activities of civil society associations, clubs, house councils, schools and kindergartens, enterprises, tourist agencies and the like. Much more attention as so far should be devoted to educating and informing people about the benefits of living nearby green spaces and elevating their awareness of the necessity to take over their own responsibility for preserving the green spaces. At the same time local people should be much more as so far included in the process of land planning and policy making; their wishes and suggestions should be fully considered. As in the case of the Hague School Paintings and its linking to Green Rings also in Koper a similar strategy to develop commitment of local people for green space should be evolved (Aalbers and Eckerberg, 2010). The reconstruction of old city centre in the sense of bringing together culture and landscape would be one of the good opportunities to gather peoples' ideas and their efforts for fund raising at national and international funds. Furthermore, as in the case of Leipzig also in Municipality Koper availability of green space to its urban dwellers can be extended by the creation of green corridors between the town and its rural surroundings. Besides favourable space effects these actions could give also more opportunity to evolve cooperation of various sorts among urban and rural dwellers of the Municipality Koper. Considering the space near Koper harbour the strategy of Green belt policy combined with building on brown fields like in Manchester's case could be applied. In some respect this has already been taking place by the Koper harbour authorities but with additional cooperation among the local people and municipality officers these endowers could be even more effective and satisfactory for all interested.

“Rural Development Plan 2007-2013”

Considering the development problems of Istrian countryside (lack of employment opportunities and low incomes, depopulation, abandonment of agricultural activities, unsuitable infrastructure) the policy makers of Municipality Koper wish to give impetus in the region to tourism and recreation development connected to agriculture. Getting the resources through the measures of Rural Development Plan 2007-2013 (RDP) seems suitable approach to stimulate these activities. It is expected that in this way obtained resources could enable the maintenance of traditional land use as well as stimulation of alternative agriculture and preservation of cultural landscape and environment.

Some recent research in Slovenia (Čerňič Istenič, 2010) showed that the effectiveness of RDP implementation is significantly related to capacities and skills of local people to participate in this programme and apply for available resources. Since RDP measures (particularly at axis 3) to promote rural development through aforementioned activities were for the first time introduced in Slovenia in 2007 acquiring of such capacities and skills is a challenge for the local people and many other stakeholders as well. To boost the local population to participate in the designing and decision making on the rural development within the RDP networking into local public-private partnerships – Local Action Groups (LAGs) is encouraged and financially supported (Ministry...2007). As a new institutional form, however these groups are encountering some shortcomings in their governance operation. As research (Čerňič Istenič 2010) on some LAGs indicated (and probably holds true also for LAS Istre (LAG of Istria) that gather stakeholders from Koper, Izola and Piran) partnership principle was not yet brought completely into force. Short-term interests of individual members, particularly those who are in a position to have better access to various kinds of information, happened to surpass common

strategies and benefits and led to discrimination among the members pertaining to projects' resources access. This shortcoming is related to general deficiency of culture of cooperation and feeling of social responsibility in a society which leads to a lack of trust and insufficient amount of social capital among the members. Additional reason for shortcomings of LAGs governance rests also in general lack of sufficient resources available for all members – among the local people there is far more ideas than resources (also from RDP) to accomplish them. Till now in Slovenia there has been no private funds available for rural development as they exist in many EU countries.

Another issue indicated from aforementioned research is unclear understanding what the meaning of state support actually is. There are considerable discrepancies in perceptions among many beneficiaries related to the amount of their project work (preparation of project applications, gathering the documents and bills, writing reports) and the value of this work expressed in payments by the RDP. Thus, the beneficiaries complain that their work is not paid enough. They do not see that state support is just one part of available resources, that their personal involvement is required too. So far these misunderstandings had negative impacts on willingness of potential applicants, particularly farmers and NGOs to take part in projects of RDP axis 3 more fully. It is supposed (among some stakeholders) that with presentations of good practices – successful and satisfied beneficiaries – such attitudes will change and get more realistic. But at the same time, in the future more attention and support from upper levels institutions, e.g. Ministry of Agriculture, Forestry and Food should be given (more clearly defined procedures of project tenders and less demanding criteria for the applicants) to stimulate those potential applicants lacking sufficient amount of initial capital and project work experiences.

The strategy of Rural Development Plan 2007-2013 in Municipality Koper should consider these findings. Among all it is very important that operational rules of LAGs and responsibilities of its members are very clearly defined. To evolve the culture of cooperation more room should be given to negotiations and reconciliation of different interests among the members. Advocates of this particular strategy also would need to search for other, also not public resources for accomplishment of their ideas. In this regards they would need more knowledge and skills related to rural policy, legislation, administrative procedures and philosophy of social capital creation. Therefore, an additional element of the strategy could be organization and maintenance of high quality educational and informative activities of various topics (also of subjects researched in the frame of PLUREL project) for all interested in rural development issues.

This Rural Development Plan (RDP) strategy could be partly compared with the “Green Blue Services Strategy” in The Haag Region, with the difference that the second one is implemented on the regional level and it has less available measures for implementation as RDP. Also the “Farming as a natural way to manage urban/rural limit in urban fringe” strategy from the Montpellier region is quite similar to the RDP, especially to its second pillar dealing with the promotion of eco-system services. “Local economic and community development” strategy from the Manchester region is connected with European Fund for Agriculture and that is why it has some similarities with RDP strategy for the Koper region.

4 Conclusions

According to the MOLAND results the Business as Usual scenario will strongly impact the best agricultural land so the aim of protecting the best agricultural soils will not be achieved, except the strategy “Land use efficiency and protection of the best agricultural land” will be incorporated earlier in the planning system (e.g. as zoning). Because of declining of residential areas in the hinterland according to results of MOLAND for the Business as Usual scenario, there will be possibility for implementation of “Green and

recreational areas to increase quality of living” strategy, if they will incorporate hinterland areas in the green system of the town.

Hyper Tech scenario will impact the coastal zone mainly and the hinterland will stay less attractive for any kind of activities. This means that Rural Development Strategy 2007-2013 will hardly be implemented since the strategy main idea is to increase environmental friendly tourism in connection with extensive farming system in the hinterland. Similar to BAU scenario, the Hyper Tech scenario will provoke more natural areas on to account of economic and residential areas in the hinterland. This is positive for the “green and recreational areas to increase quality of living” strategy if they will incorporate in the city green system the above mentioned areas as well. The predicted results from the MOLAND model are not very optimistic for the “Land use efficiency and protection of the best agricultural land” strategy. The best agricultural land is supposed to be used either for new built up areas either will be turned to natural areas. In the first case the land will be lost permanently. Although in the second case the land will not be lost permanently this will provoke decreasing of agriculture in the area and its weaker position in negotiating for land.

The results of the Peak Oil scenario are very promising for the “Rural Development Plan 2007-2013” strategy in the Koper region, because there will be enough natural resources to be implemented properly. On the other hand in this scenario the “Green and recreational areas to increase quality of living” strategy competes for the same natural resources as the previously mentioned strategy. But the scenario shows more positive results for the firstly mentioned strategy. According to the “Land use efficiency and protection of the best agricultural land” strategy, this scenario shows the most positive results for it amongst the all three scenarios.

Comparing the Koper case study strategies with those from other case studies we can observe some similarities with strategies from The Hague, Montpellier, Leipzig, and Manchester region.

The stakeholders chosen in the Koper case study have willingly cooperated in the process of the PLUREL project and have showed good knowledge and great interest to participate in the activities of the project regarding planning issues.

The Municipality of Koper is very interested in an inter-sectoral planning approach, which can avoid land use conflicts in the early preparatory phase. Finally, we can hope that the right spatial planning approach and good cooperation amongst all the stakeholders will help the Municipality of Koper to prepare spatial documents that will enable sustainable future development of the municipality.

As it comes from the final results of the PLUREL project, improved strategies in the Municipality of Koper need to include: (1) de facto participation of local actors in the planning process of local land use, (2) a process of broader educating and informing people about the benefits of living near green spaces and raising their awareness of the need to take responsibility themselves for preserving green spaces and (3) the organization and maintenance of high quality broader educational and informative activities on various topics for all interested in rural development issues.

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