



**LE CITTÀ RESILIENTI: DAI PIANI ALLE AZIONI
DI ADATTAMENTO PER IL CAMBIAMENTO**
**Presentazione dei risultati del progetto ACT-
Adapting to Climate Change in Time**

“The City of Patras LAP”

Firenze , May 17th

Konstadinos Konstadakopoulos

Municipality of Patras Vision



“ to provide a safe environment to its citizens in the face of the current and coming impacts of climate change ”

PATRAS' ACT PROJECT



**The Time is Now
Prepare- Adapt- Survive**

ACT Project
“Adapting to Climate
Change in Time”



Strategy for Local Adaptation
which takes into account the
environmental, social and
economic impacts of climate
change



Increase Patras resistance
capacity to climate change

CREATION OF PATRAS LOCAL ADAPTATION BOARD



- | | | |
|-----|--|---|
| 1. | Municipality of Patras | Deputy Mayor for urban and environmental planning |
| 2. | Municipality of Patras | Deputy Mayor for Development and Planning |
| 3. | Municipality of Patras | Deputy Mayor of waste management |
| 4. | Municipality of Patras | Representative of the major opposition |
| 5. | Municipality of Patras | Representative of the minor opposition |
| 6. | Region of Western Greece | Technical Representative |
| 7. | University of Patras | Expert Representative |
| 8. | University of Patras | Expert Representative |
| 9. | University of Patras | Expert Representative |
| 10. | Technical Chamber | Expert Representative |
| 11. | Geotechnical Chamber | Expert Representative |
| 12. | Chamber of Commerce and Industry of Patras | Expert Representative |
| 13. | Union of Agricultural L Cooperatives of Patras | Expert Representative |
| 14. | ADEP S.A. | Representative |
| 15. | NGO Environmental | Expert Representative |

DEFINITION OF A MUNICIPAL STRUCTURE FOR CLIMATE CHANGE ADAPTATION



Overall coordination and monitoring

- **ADEP S.A. – Environment & Sustainable Development (K. Konstadakopoulos, E. Alexopoulos)**

Involved departments of the Municipality

- Directorate of Financial Management
- Directorate of Annuities
- Directorate of Informatics
- Directorate of Town Planning and design applications
- Directorate of Technical services
- Directorate of waste collection
- Directorate of waste disposal
- Directorate of Directorate of Environment and green areas
- Directorate of Maintenance of public spaces and direct labor
- Municipal Company of Water Supply and sewage
- Social organization of Municipality of Patras

PATRAS CHARACTERISTICS



- Coastal city of more than 200.000 inhabitants
- Natura 2000 area of Panachaiko Mountain
- Water is a very important commodity
- Economy in which prevail the Services, with marginalisation of the primary (production) sector.
- Significant cultural heritage monuments in urban and rural areas

These characteristics are essential in order to define the most important sectors on which the impact of climate change needs to be assessed.

Selection of the most vulnerable sectors



Among the assessed sectors Patras more vulnerable ones are :

Priority Critical
Biodiversity - Forest
Coastal zones erosion
Water Supply

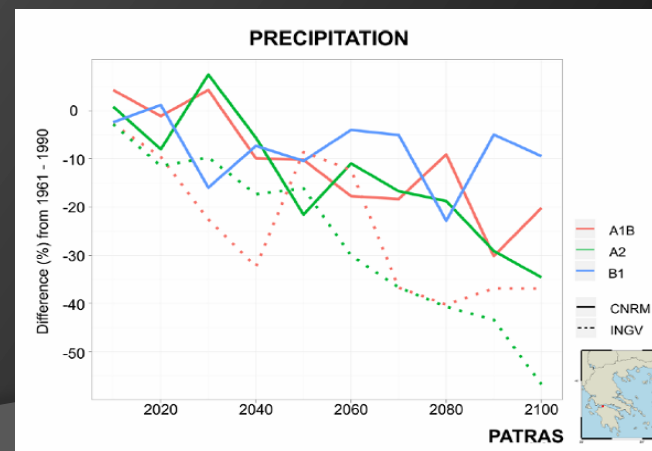
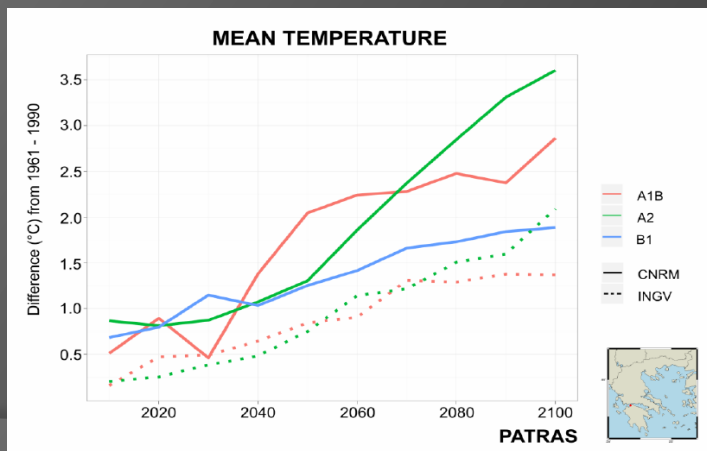
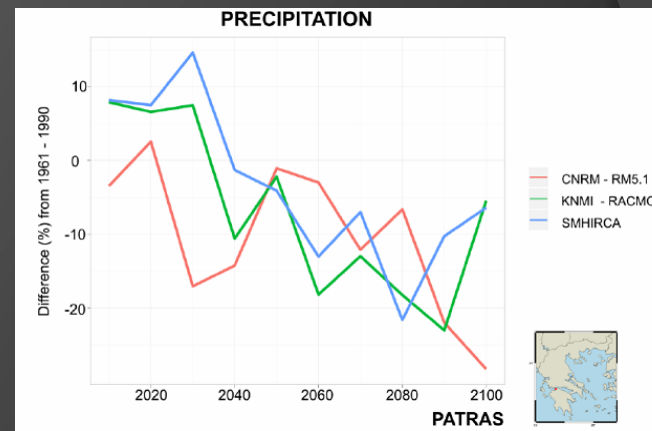
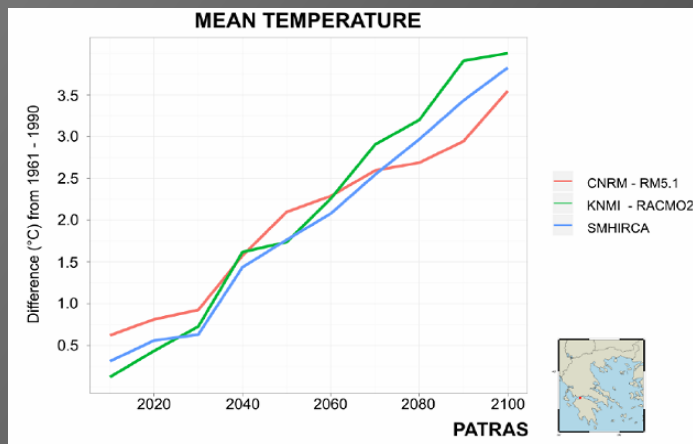
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Patras climate projections (2100)



Increase of mean temperature
between 1,4 and 4,0°C

Decrease of annual precipitation
between 5,5 και 56,8 %





DEFINING VULNERABILITY AND ADAPTATION BASELINE

BIODIVERSITY AND FORESTS



The area with biodiversity and forest interest in Patras is the Mountain Panachaikos. This area includes a wealth of important environmental elements such as forest areas, rivers streams and wetlands. It is also about the 70% of the area of the new Municipality of Patras, providing unique resources to develop the region, as water , agriculture and ecotourism



BIODIVERSITY AND FORESTS (II)



- Biodiversity and Forests may be affected by the weather due to changes :
 - An increase in temperatures, could create the drying of the forest areas as heat is often a stress factor.
 - Increase of forest fire incidents as the wider areas will suffer from increased numbers of forest fires.
 - Climate change is expected to affect tree species distributions (*Abies Cephallonica* and other Conifer forests)
 - Extreme flooding events during summer as the number of days with heavy rain events is predicted to increase.



BIODIVERSITY AND FORESTS(III): ADAPTIVE CAPACITY



↓ Forest Managing Plans have not yet integrated the variable of Climate Change.

↑ Elaboration of integrated Plans for Habitats, flora, fauna and forest areas, in national, regional and local level which include climate change variables.

COASTAL ZONE EROSION



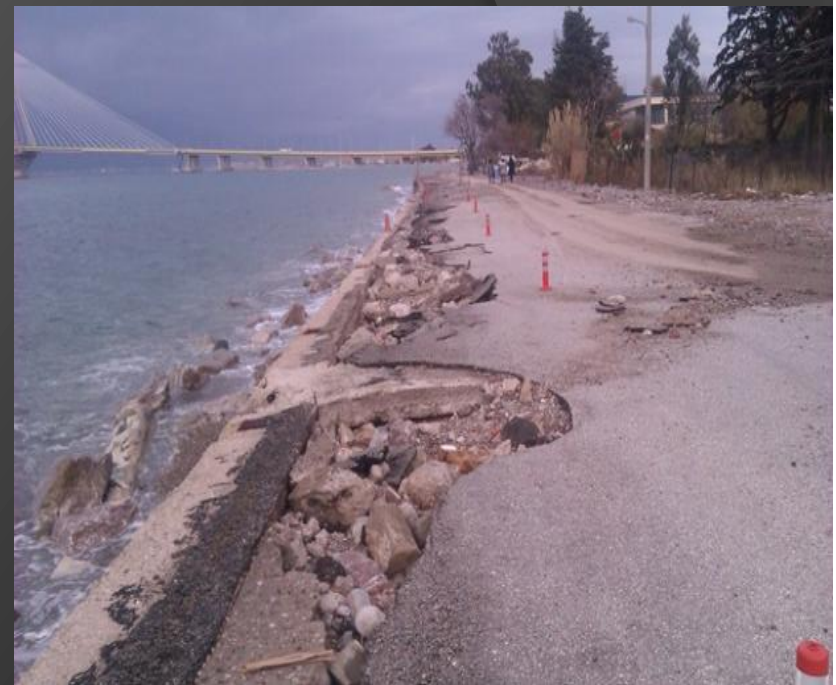
March 2008

- Coastal erosion in Patras:
 - Is already happening
 - Patras experiences destruction in coastal roads and private assets, while human lives are also under threat.

COASTAL ZONE EROSION (II)

Two areas most vulnerable:

- **Rion beach (East side)**
 - Reduced material from the rivers due to their use for the construction of the Patras-Korinthos highway.
 - Construction of a jetty in front of Porto Rio hotel.
- **Monodendri, Vraxneika, Tsoukalaika (West side)**
 - Illegal constructions on the beach



COASTAL ZONES EROSION (III)



Impacts on:

- Road network
- Tourism
- Economy
- Local habitants
- Private assets



COASTAL ZONE EROSION (IV)

Adaptive capacity:

-  No available studies for the simulation of climate change impact on the coastal zone
-  Elaboration of Studies for the protection of the coastal zone



WATER SUPPLY



- Patras today: 3.000 m³/h
- Main sources: River Glafkos, Drillings
- Marginal cover of the needs



WATER SUPPLY (II)



- Water supply needs will increase

	2005	2020	2035
Residents	17.833.260	22.727.220	28.755.000
Visitors	200.000	300.000	400.000
Hotels	179.520	269.280	359.040
Total	18.212.780	23.296.500	29.514.040

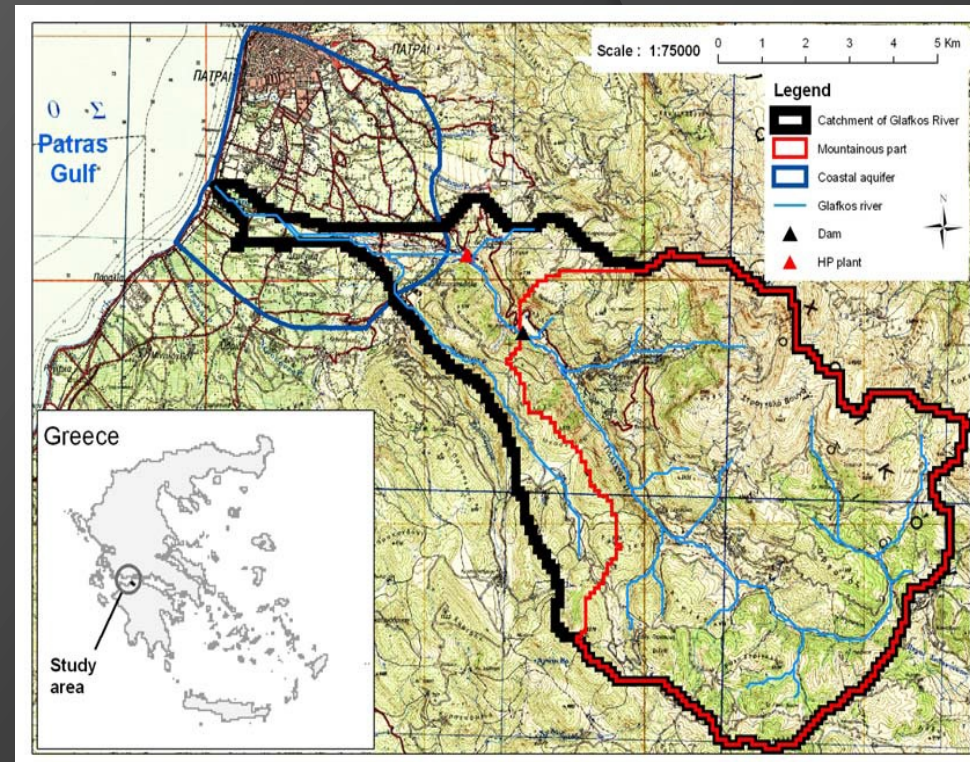
- Climate change affects the hydrological cycle, consequently the availability of water.

WATER SUPPLY (III)

Sensitivity

River basin of River Glafkos

- Water supply of Patras
- Production of Electricity
- Irrigation



WATER SUPPLY (IV)



- No significant variations are expected in the reservoirs of Glafkos river
- The quality of underground water will be influenced by the human activities
- Special attention is to be paid in the areas around the drillings

CULTURAL HERITAGE



- Currently, there is no systematic recording of the vulnerability parameters for the monuments and sites in the city of Patras, mainly due to the large number of institutions that are in charge for the maintenance of public buildings, monuments and sites. Moreover, there is no established framework for the recording of the condition of privately owned buildings.



CULTURAL HERITAGE

(III)



- The increased mean temperature and the decreased mean precipitation result in:

“Decreased rate of material loss from the cultural monuments”

- A network of air quality stations is necessary for a more thorough evaluation.



LOCAL ADAPTATION PLAN TO CLIMATE CHANGE

The strategic objectives and targets of the Local Adaptation Plan



The Strategic objectives of the Adaptation Plan are to :

- Raise awareness and understanding of the impacts of climate change in the city of Patras and the importance of adaptation measures amongst decision makers, stakeholders and the local community.
- Integrate adaptation measures in the local agenda.
- Support decisions related to the adaptation to climate change.
- Promote the concept of adaptation in any new developments.

The strategic objectives and targets of the Local Adaptation Plan



The targets of the Plan are to:

- Identify the most important effects of climate change in the city of Patras.
- Prioritize the actions needed in order for Patras to adapt to climate change.
- Ensure the appropriate response of the Municipality and of the local community during crisis management plans for climate change impacts.
- Strengthen the decision-making processes of Patras towards adaptation to climate change.
- Promote the participation of all local actors in the planning and implementation of adaptation measures.
- Ensure that the design and implementation of new infrastructure takes into account the effects of climate change predicted to occur.



PATRAS ADAPTATION PLAN MEASURES

BIODIVERSITY AND FORESTS : Best measures for Patras



GENERAL MEASURES

- The manipulation of vegetation
- The development of appropriate infrastructure for fire protection
- Raising awareness of the public
- The better organization of fire protection
- Operation of Programmes on biodiversity awareness

COASTAL ZONE EROSION :

Best measures for Patras



GENERAL MEASURES

- Protection infrastructure on the coastal roads
- Interventions to support beaches an the botom of sealines.
- Interventions to tackle intense waves
- Intervention to decrease erosion phenomena

WATER SUPPLY :

Best measures for Patras



GENERAL MEASURES

- Leakage control system
- Securing new water sources
- Raising awareness on water saving

WATER SUPPLY :

Best measures for Patras (I)



- Developing by DEYAP a permanent Leakage Control System according to the International Water Association (IWA) methodology
- Construction of a new water dam for the wider Patras region
- Installation of water flow regulator in households
- Construction and operation of PATRAS WATER HOUSE (Front Office for water saving awareness)

CULTURAL HERITAGE

Adaptation measures



- The different public and private institutions and stakeholders related to cultural heritage will be invited to cooperate and share information in order to evaluate the vulnerability of the identified buildings, monuments and sites and calculate the risk associated to it
- A better local monitoring of climate, environmental and pollution parameters is needed

Summary of important adaptation measures



	Sector	Adaptation action-measure	Projected time-frame	Budget	Source of funding
1.	Water	Water House	2013	222.000 €	WaS4D – Water Saving for Development, Interreg Ivc Greece - Italy 2007-2013.
2.	Water	Dam Peiros - Parapeiros	2015	130.000.000 €	Ministry of Environment - EU
3.	Water	Public awareness program for i water saving - Distribution of water flow regulators	2013	9.000 €	WaS4D – Water Saving for Development, Interreg Ivc Greece - Italy 2007-2013.
4.	Biodiversity	Center of Environmental Information of Panachaiko Natura 2000 area	2013	7.500 €	Sponsored by Wind Park Enterprise
5.	Biodiversity - Forests	Hire equipment for cleaning grass - branches to prevent fires	2013	61.000 €	Patras Municipality, Civil Protection

Summary of important adaptation measures II



	Sector	Adaptation action-measure	Projected time-frame	Budget	Source of funding
6.	Biodiversity	Environmental awareness program for students to protect biodiversity and forests of Panachaiko	2014	18.000 €	Ministry of environment
7.	Energy	Energy information center for biomass	2013	20.000 €	PROFORBIOMED – MED Programme
8.	Coastal Zone (Rion beach)	-from Porto Rio Hotel by Rio Beach hotel, protective wall inclined to the promenade. - from hotel Rio Beach Street until Alexander the Great, str. a protective wall with a flair for the coastal road to spread gravel to create an "artificial beach".			

Summary of important adaptation measures III



	Sector	Adaptation action-measure	Projected time-frame	Budget	Source of funding
9.	coastal Zone (Coastline Monodendri - Vrachneika - Tsoukalaika)	Overall, it is proposed to construct 24 breakwaters freeboard and 7 lateral projections.		5.914.300 €	
10.	Biodiversity - Forests	Plan a forestry fire protection		15.000	
		Study maintenance, improvement and boring forest roads and placement notices		25.000	
		Technical studies fire protection		30.000	
		Silvicultural manipulations of vegetation in areas mixing Hood - Settlements		45.000	
		Informing residents about fire-and building fire protection measures		12.000	

Summary of important adaptation measures IV



	Sector	Adaptation Actions-measures	Projected time-frame	Budget	Source of funding
11.	Biodiversity - Forests	Enrichment vegetation - additional plantings - reforestation		45.000	
		Maintenance of existing firebreaks zones in high risk areas		19.500	
		Cleaning vegetation along high voltage transmission lines		N/A	
		Maintenance of existing forest roads		15.000	
		Improvement of existing forest roads		75.000	
		Opening of new forest roads in high risk areas		37.500	
		Placing information signs		15.000	
		Construction of new fire observatories		40.000	
		Construction of new water reservoirs fire protection		100.000	

Summary of important adaptation measures V



	Sector	Adaptation action-measure	Projected time-frame	Budget	Source of funding
12.	Biodiversity - Forests	Silvicultural manipulations vegetation in high risk areas		90.000	
		Silvicultural manipulations vegetation in forests of Aleppo pine		45.000	
		Install new fire hydrants		20.000	
		Update firefighting personnel and volunteers		6.000	
		Update OTA staff and elected evacuation plans for communities		3.000	
		Evacualltion plans		N/A	

Summary of important adaptation measures VI



	Sector	Adaptation action-measure	Projected time-frame	Budget	Source of funding
13.	Water	A permanent Leakage Control System according to the International Water Association (IWA) methodology			Municipal Enterprise for Water Supply and Irrigation of Patras
14.	Tourism	A network of rural bike routes on Panachaiko mountain area.	2013	135.000	Wonder By Bicycle, Interreg Greece-Italy 2007-2013



THANK YOU FOR YOUR
ATTENTION