



Project:

National Climate Change Adaptation Strategy Instrument for Pre-Accession Assistance (IPA)

Fourth CB (Capacity building) Meeting

Life SEC Adapt Project (LIFE14 CCA/IT/000316)

06. July, 2017., Pula

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National CC Adaptation Strategy, Team Leader



Coordinated by



This project is funded by European Union

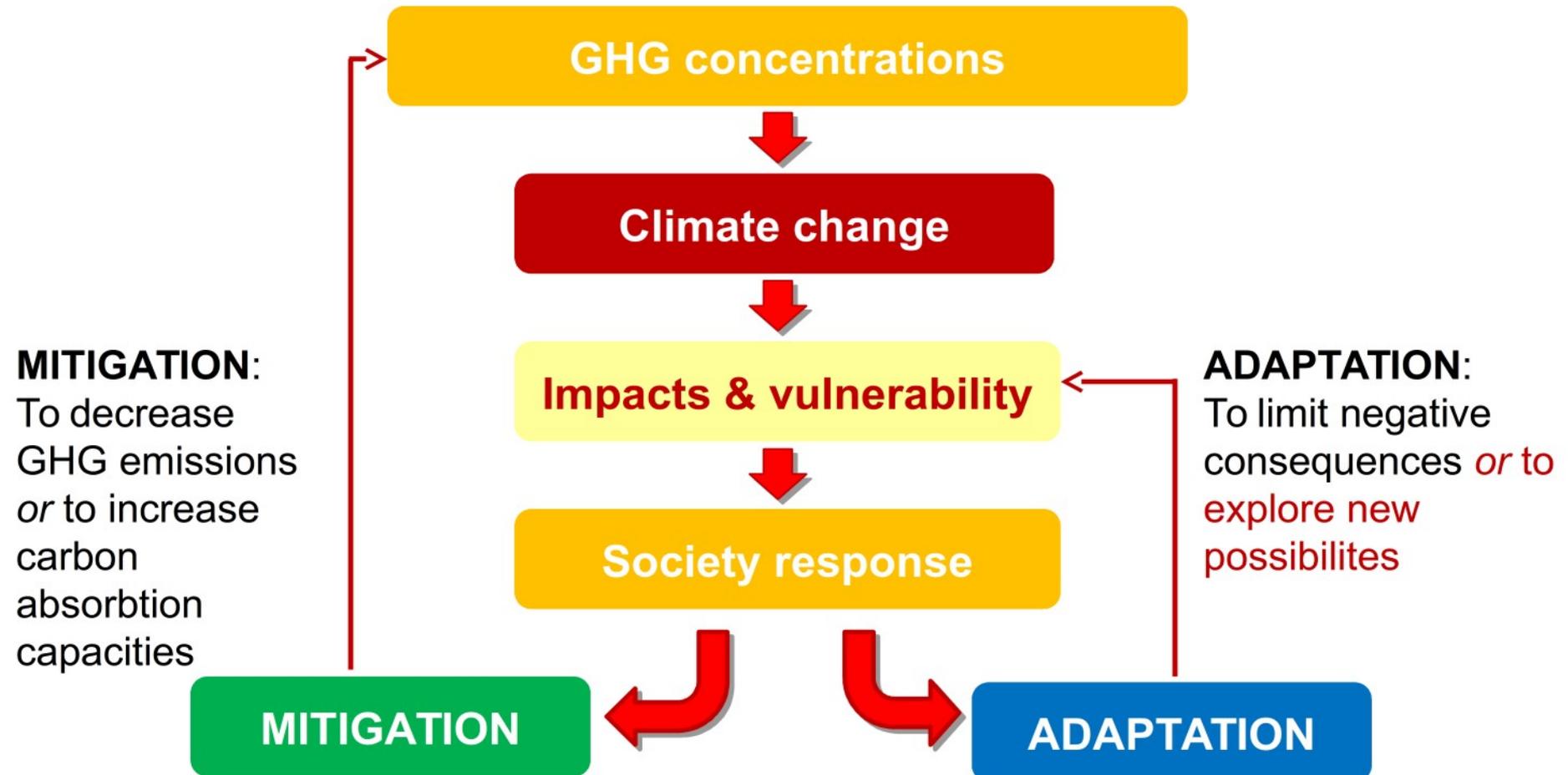


Project card

Full project title:	Strengthening the capacity of the Ministry of Environment and Energy for climate change adaptation and preparation of the Draft Strategy for adaptation to climate change
Working title:	Climate Change Adaptation Strategy
Program:	<i>Instrument for Pre-Accession Assistance (IPA)</i>
Project start:	17. 05. 2016.
Project end:	17. 11. 2017. (18 months)
Contract number:	TF/HR/P3-M1-O1-0101
Client:	Central Finance and Contracting Agency (SAFU) Ulica grada Vukovara 284 blok C, 10 000 Zagreb Tel: +385 (0) 1 4591 245 Fax: +385 (0) 1 4591 075
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Mitigation vs. Adaptation



Mitigation or Adaptation

Less mitigation

**More GHG
emissions**



**More pronounced
climate change**

**More impact on
society and
nature**



**More adaptation
required**

More mitigation

**Less GHG
emissions**



**Less pronounced
climate change**

**Less impact on
society and
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**Less adaptation
required**

Adaptation [lat. *adaptio*]:

„Practical steps to protect countries and communities from the likely disruption and damage that will result from effects of climate change.”

(website of the UNFCCC Secretariat)

Without adaptation...



... with adaptation



CC ADAPTATION => **(DISASTER RISK MANAGEMENT)** => **DEVELOPMENT**

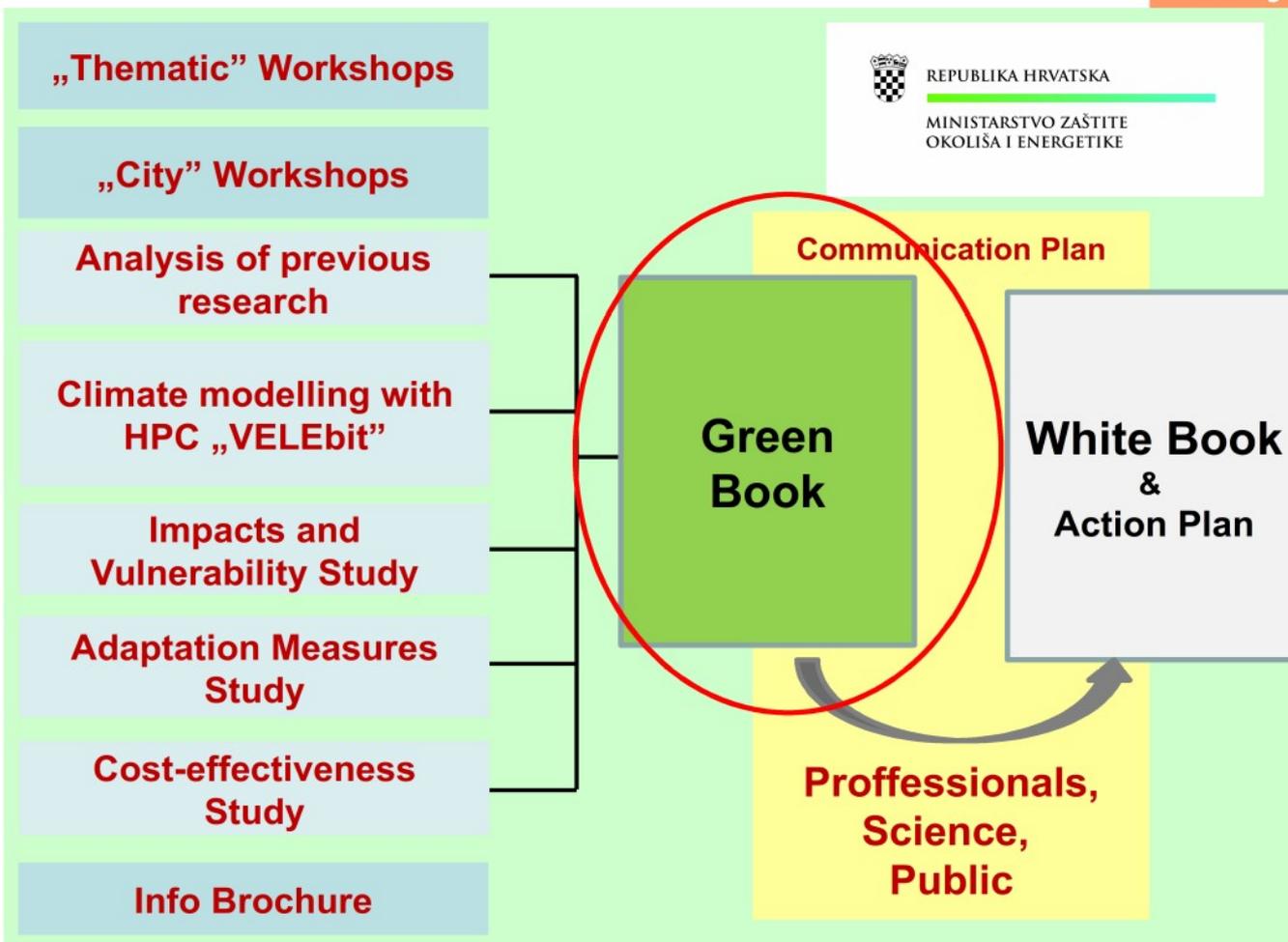


Climate Change Adaptation Strategy

Project Steering Committee

MZOE
 SAFU

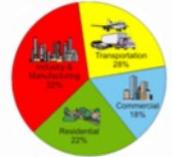
Min. of Regional
 Development & EU funds
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Sveučilište u Zagrebu
 Sveučilišni računski centar

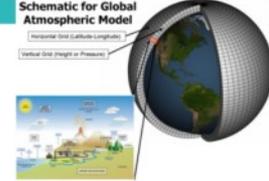


Analysis of previous research



- cca. 150 references
- Variations from sector to sector: in some sectors **only few research exist** on CC impacts, vulnerability or adaptation
- Existing research deals mostly with specific aspects within sector or subject- **lack of research to deal with the whole phenomenon**
- perceived lack of participation of research from **economic - financial sector** related to CC

CONCLUSION: The need for intensification of research (in number and scope) related to impacts, vulnerability and adaptation to CC



Climate modelling with HPC „VELEbit”: projections for Croatia until 2040. and view to 2070.



Annual daily temperature (T_{2m}): **1 to 1.5°C** increase; highest in **winter and summer** and **in coastal Croatia**. (by 2070. increase of T_{2m} up to **2.2°C**)



Annual precipitation: mixed signal (region & the global model used depended, variations 5-10%)
Slight increase in **winter and spring** for most parts of Croatia, while in **summer and autumn precipitation decrease** would prevail. (by 2070. precipitation **decrease up to 15%** in all seasons except winter)



Snow cover: by 2040. **decrease** (up to 50% in Gorski kotar) (by 2070. **further decrease**).



SLR increase by rate of 3,2 mm/y (IPCC, 2013.), estimates used by the Project for Adriatic (Croatia) in range from **32 to 63 cm** (RCP4.5) by the end of 21st century

- Higher frequency of **drought periods and heat waves** (also less common and milder winter polar waves).
- **Evapotranspiration** increase **5-10%** until 2040. (and **by 15%** until 2070.)
- **Surface runoff** would decrease up to **10%** by 2040.
- Variations in **incident solar energy flux** (W/m^2) are **2-5%** (decrease in winter and spring, increase in summer & autumn)
- Number of **dry days** (*DD*) shows increasing trend (especially **N Istria, the Dalmatian hinterland, and NW Cro.**).
- Higher frequency of **extreme weather events** (hail, cloudbursts, storm winds, waterspouts ..).
- Share in **extreme quantities of precipitation** (*R95T*) in slight increase (especially **E Slavonija, N and middle Adriatic**).

Impacts and Vulnerability Study 1/4



- The **most comprehensive estimate of climate change impacts and vulnerability** for the most important sectors that have been developed up to date for the Republic of Croatia
- It complements six National Reports under the UNFCCC but significantly **exceeds their analytical scope and depth**

□ Hydrology, Marine and water resources

- **Deterioration of hydrological conditions** (higher frequency and intensity of dry periods + intensification of flood situations).
- Particularly endangered **coastal karst aquifers** and other coastal water phenomena (lakes, swamps, springs)
- Reduction of the **mean annual** and **minimum annual flows**
- Very pronounced **increase in water temperature**

□ Agriculture

- expects the most severe impacts of climate change
- **direct yield reduction by 3-8%**
- two key problems are **soil water shortage (drought)** + elevated **air temperatures**
- Additional problems associated with **extreme weather events** and **flooding** > higher price of food production

Impacts and Vulnerability Study 2/4



□ Forestry

- moving of phenological phases of forest trees (vegetative phase, flowering, fruit phase, etc.)
- reduced productivity of certain forest ecosystems
- increased incidence of forest fires and seasonal extension and geographical range of fires
- shifting the distribution of forest pests
- more forest damage is expected due to increase in extreme weather conditions

□ Fishery (fishing and aquaculture)

- Increase of Adriatic sea temp. by 1.6 to 2.4 ° C by 2070. > Migration of native fish deeper and further north, and the arrival of new species
- Adriatic acidity increase by 0.1 to 0.2 degrees > a negative effect on the shellfish breeding
- twofold effect for breeding marine species: positive for thermophilic species (tuna and sea bream), and negative for cold-breeding species (sea bass and oysters)
- Rising temperatures and reduced quantities of fresh water will be a big challenge for freshwater aquaculture

□ Energy sector

- impact of climate extremes on the production, transmission and distribution of energy
- expected increase in demand for energy (e.g. for cooling) in seasons with difficult production conditions
- lower contribution of hydro power plants in the hot period
- major problems in power systems with flow-through cooling (thermal power plants and nuclear power plant)
- greater physical vulnerability of the entire energy system due to extreme weather conditions

Impacts and Vulnerability Study 3/4



□ Tourism

- An increased need for energy and water in the season when the supply is hampered
- **Reduced living comfort** in outdoor areas (daily temperature rise, higher frequency and intensity of extreme weather events, increased sun insolation)
- Increased difficulties in **fresh water supply**
- possible and expected positive effect on pre- and post-season

□ Natural ecosystems and biodiversity

- Due to climate change, it is expected: **flooding** of coastal habitats, **salination** of coastal land and freshwater habitats, **dewatering/drying** of wetland habitats, **increase of arid areas**, **reduction and change of share** and disappearance of some habitats and species, with **biodiversity decline** and appearance and spread of some **invasive species**.
- Negative consequences on species level include: **reduction of vigour** of the individual entities; individual entities **damage from illnesses and pests**; appearance of a competing invasive species; **population reduction**; reduction of species' areas; separation of species' areas leading to **disjunct distribution of populations**; the occurrence of threats for specific species and regional or global extinction of species.

□ Health

- the impact of extreme weather events will contribute to the **rise of chronic non-communicable diseases** (cardiovascular, respiratory, etc.) and increased mortality
- **changes in epidemiology of infectious diseases** (e.g. emergence of new vector-borne diseases)
- Impact of climate change on **air quality, safety of food and water and level of contaminants in the environment**

Impacts and Vulnerability Study 4/4



□ Climate change related risk management

Expected vulnerabilities are related to health, property and the environment impacts due to:

- Extremes (on national level) with very high risk of occurrence :
 - Floods caused by spillage of terrestrial water bodies,
 - Open type fires and industrial accidents,
 - Landslides.
- Extremes (on national level) with high risk of occurrence :
 - Extreme temperatures, epidemics and pandemics.

□ Spatial planning and coastal zone management

In relation to CC, three types of impacts have special importance from the spatial planning and the coastal zone management aspect:

- Increased rates of **coastal flooding** (consequences of SLR and higher frequency and power of extreme weather events);
- **Thermal loads** of urban environments with negative impact on human life and health as a result of the growth in maximum daily temperatures, in particular the rise in hot days and days with temperatures above 35 ° C (hot waves),
- **Floods in settlements** as a consequence of increased frequency and intensity of extreme weather conditions marked by **large amounts of precipitation in the short term**.

Adaptation Measures Study



- **83 measures suggested** based on analytical background (climate models, analyses of impacts and vulnerabilities, ...)
- The lack of knowledge and the lack of research on climate change in certain sectors requires a large number of **non-structural measures** directed towards:
 - **increasing the awareness** and knowledge on CC adaptation,
 - **adjustment of the institutional framework** for CC adaptation,
 - significant increase in the number and scope of **research and monitoring**,Before final decisions on type and implementation of (infra)structural measures, **no-regret** and **low-regret** measures are recommended.
- Each sector has **assessment of the present state** and **sector development estimates** under **BAU conditions**,
- All measures contain elements: name, label, description, period of implementation, the expected results of implementation, responsibility for implementation and the general cost of implementation (from low to very high cost categories)
- There is significant **sectoral interdependence** with regard to the effects of climate change, and the measures that will be proposed by the Action Plan will be complementary by their nature

Cost-effectiveness Study: multi-criteria analysis



- **Priority measures** are selected using a **multi-criteria analysis**:
 - Financial criteria (cost)
 - Adaptation criteria (feasibility, barriers, legislation alignment...)
 - Climate related criteria
 - Economic criteria (economic risks, jobs, investment incentives...)
 - Ecological criteria
 - Social criteria
 - Political and institutional criteria (contribution to political stability, improvement of governance)
- Need to **include as many key stakeholders** on specific sectors
- Only **very high-priority measures** will be included in the **Action Plan** for the 2018-2023 period



Project web: prilagodba-klimi.hr

Prijelazni instrument Europske unije za Hrvatsku

**STRATEGIJA PRILAGODBE
KLIMATSKIM
PROMJENAMA**

*Jačanje kapaciteta Ministarstva zaštite okoliša i prirode
za prilagodbu klimatskim promjenama te priprema
Nacrta Strategije prilagodbe klimatskim promjenama*

Korisnik projekta
 REPUBLIKA HRVATSKA
MINISTARSTVO ZAŠTITE
OKOLIŠA I PRIRODE

Projekt provodi
 eptisa
Adria d.o.o.

Početna Najave Vijesti Galerija Dokumenti komentari Preuzimanje Prijave



O projektu

Očekivani rezultati

Kontekst

Za više informacija

Korisne poveznice

O projektu

Za potrebe Ministarstva zaštite okoliša i prirode provodi se projekt „Jačanje kapaciteta Ministarstva zaštite okoliša i prirode za prilagodbu klimatskim promjenama te priprema Nacrta Strategije prilagodbe klimatskim promjenama” koji se financira sredstvima iz Prijelaznog instrumenta tehničke pomoći EU. Projekt se provodi od svibnja 2016. do studenoga 2017. godine.



Najave

Zagreb, 8.-9.9.2016., Draškovićeva 45, HGK, dvodnevna radionica: Prenošenje iskustava zemalja EU u izradi i provedbi strategija prilagodbe klimatskim promjenama

[8-9/09/2016](#)

Vijesti

Zagreb, 15.6.2016., Javnosti je predstavljen projekt „Jačanje kapaciteta Ministarstva zaštite okoliša i prirode za prilagodbu klimatskim promjenama te priprema Nacrta Strategije prilagodbe klimatskim promjenama” i održana Uvodna konferencija projekta

[15/06/2016](#)



Hvala!
Thank you!
Grazie!

Prijelazni instrument
Europske unije za Hrvatsku

STRATEGIJA PRILAGODBE KLIMATSKIM PROMJENAMA

*Jačanje kapaciteta Ministarstva zaštite okoliša i energetike
za prilagodbu klimatskim promjenama te priprema
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