URBANPROOF TOOL: A DECISION SUPPORT TOOL FOR CLIMATE PROOFING URBAN MUNICIPALITIES


2nd International Conference, ADAPTtoCLIMATE, 24-25 June 2019, Heraklion, Crete, Greece
The overall aim of the UrbanProof project is to increase the resilience of municipalities to climate change equipping them with a powerful tool for supporting better informed decision making on climate change adaptation planning.
PARTNERS

Government Body

Coordinator

Department of Environment, Ministry of Agriculture, Rural Development and Environment

Research Institutes

National Technical University Of Athens

National Observatory of Athens

University IUAV of Venice

Municipalities

Strovolos Municipality

Municipality of Peristeri

Comune di Reggio nell’Emilia
• Εκτίμηση των επιπτώσεων της κλιματικής αλλαγής στους Δήμους του έργου.

• Αξιολόγηση των διαθέσιμων επιλογών προσαρμογής για την αντιμετώπιση των επιπτώσεων.

• Ανάπτυξη και εφαρμογή του εργαλείου UrbanProof για την υποστήριξη των Δήμων και την ενίσχυση της συμμετοχής των ενδιαφερόμενων φορέων στη διαδικασία της προσαρμογής.

• Υλοποίηση και επίδειξη πράσινων και ήπιων μέτρων προσαρμογής μικρής κλίμακας στους Δήμους του Έργου.

• Ανάπτυξη τοπικών στρατηγικών προσαρμογής στην κλιματική αλλαγή για τους Δήμους του Έργου.
The URBANPROOF toolkit

- The URBANPROOF toolkit is a powerful decision support system aimed to enable better informed decision making for climate change adaptation planning.

- The user is guided through the different features of the toolkit in order to gain insight into the climate change impacts to the urban environment, to explore and evaluate the available adaptation options and to investigate the effect of adaptation interventions in increasing climate change resilience.

- The tool currently may be used for conducting an impact and adaptation assessment for every urban municipality in Italy, Greece and Cyprus.

- Higher resolution data are provided in the cases of the municipalities of Reggio Emilia (Italy), Peristeri (Greece) and Strovolos and Lakatamia (Cyprus) which are partners of the LIFE URBANPROOF project.

- The impacts assessed are: Floods, Heatwaves and health, Peri-urban fires, Electricity demand for cooling, Water availability and droughts, Ozone exceedances.
The impact assessment is based in the terminology adopted in IPCC (2014).

Impacts are considered to result from the interaction of **hazard** and **vulnerability**, while the latter is considered to be a function of the **exposure**, **sensitivity** and **adaptive capacity** of population and infrastructure.

- **Hazard** indicators are used to reflect the relevant climatic information.
- **Exposure** indicators used are population density, land use and critical infrastructure and are estimated with the use of geospatial databases.
- **Sensitivity** indicators are used to reflect the population groups which are considered sensitive to climate change while the **adaptive capacity** indicators may refer both to the population and the infrastructure. Examples of such indicators are: age (elderly people and very young children/infants); illiteracy; population with chronic diseases; low income (population at poverty risk, regional Gross Domestic Product); health care (hospital beds per capita).
## Geospatial Data Used

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<th>Geospatial data</th>
<th>Databases</th>
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<tr>
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<td>CORDEX regional climate model (RCM) simulations for the European domain (EURO-CORDEX) database</td>
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<td>Population density (urban block resolution)</td>
<td>Urban Atlas database - Copernicus Land Monitoring Service</td>
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<td>Population density (grid resolution: 500x500m)</td>
<td>Global Human Settlement (GHS) Population grid (LDS) - Joint Research Centre</td>
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<td>Urban trees, urban green areas</td>
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<td>Land use</td>
<td>Corine Land Cover - Copernicus Land Monitoring Service</td>
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<td>Schools, Hospitals, Cultural units</td>
<td>OpenStreetMap - Open Data Commons Open Database License Geodata.gov.gr</td>
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<td>Floods hazard zones</td>
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<td>Soil-hydraulic properties</td>
<td>European Soil Data Centre (ESDAC) - Joint Research Centre</td>
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<td>Socio-economic data</td>
<td>Eurostat, National Statistical Services</td>
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The UrbanProof toolkit consists of five interdependent modules/stages which, altogether constitute the adaptation process:

- **Stage 1:** Information on climate change
- **Stage 2:** Impact assessment
- **Stage 3:** Exploration and evaluation of adaptation options
- **Stage 4:** Development of the adaptation strategy
- **Stage 5:** Monitoring and review
Time series of climate indicators of all project municipalities for the period 1970-2100. Future projections are based on two emission scenarios: RCP4.5 & 8.5
STAGE 2: IMPACT ASSESSMENT

- Explore the climate change impacts on the urban environment and gain insight into the individual parameters (physical, structural & socio-economic) contributing to the creation of these impacts.

- The information is available for all urban municipalities of Cyprus, Greece and Italy, while for the project municipalities higher resolution information is provided.
The user can:

- Explore of the available adaptation measures for addressing climate change impacts
- Evaluate of the adaptation measures based on different criteria (MCA)
- Apply the ratings provided by a pool of experts from different stakeholder groups
- Set weights to the different evaluation criteria
STAGE 4: DEVELOPMENT OF THE ADAPTATION STRATEGY

- Prioritization of adaptation measures based on the ratings provided during Stage 3 for the multi-criteria analysis (MCA).
- The measures gathering the higher ratings (above a predefined threshold) may be included in the Local Adaptation Plans.
STAGE 5: MONITORING AND REVIEW

- Investigation of the effect of adaptation measures in enhancing climate change resilience
- Ability to edit the existing data in order to update them or to modify the weights applied
- Useful both during preparation of the adaptation plan and monitoring of its implementation

Available for all urban municipalities of Cyprus, Greece and Italy
## Implementation of Green Infrastructure Projects: Municipality of Reggio Emilia

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<th>Educational &amp; informational projects</th>
<th>Planning measures</th>
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<td>• &quot;Nilde Iotti park&quot; project</td>
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<td>• Piazza Vallisneri regeneration</td>
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<td>• Via Guasco regeneration</td>
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<td>• Land analysis to plan new green areas</td>
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<td>• Piazza Roversi regeneration</td>
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<td>• Via dei Servi regeneration</td>
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<th>Flooding – dryness phenomena reduction measures</th>
<th>Green roof projects</th>
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<td>• Green roof for San Pellegrino’ Library</td>
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<td>• Reservoir of Marmirolo Oasis</td>
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<td>• Food Forest &quot;Sorelle Sberveglieri“ park</td>
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<td>• Via del Carbone street stone pavement</td>
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**LIFE URBANPROOF**

Climate Proofing Urban Municipalities
IMPLEMENTATION OF GREEN INFRASTRUCTURE PROJECTS: MUNICIPALITY OF LAKATAMIA

Reconstruction of Melina Merkouri Avenue roundabout

- possible position of a meteorological station
- permeable concrete in various colors
- artificial well
- rainwater collection channel
- irrigation water tank
- large stones
- uncovered soil and plantings
- irrigation channel
IMPLEMENTATION OF GREEN INFRASTRUCTURE PROJECTS: MUNICIPALITY OF STROVOLOS

Area reformation into sustainable urban park (2000m$^2$)
• Botanical garden with drought resistant plants
• Plant techniques for enhancing water retention
• Rainwater collection system
• Use of advanced irrigation systems
• Use of permeable materials
• Fitness equipment producing energy
• Installation of temperature and relative humidity sensors in strategic places throughout the municipality and in buses
• Real-time geospatial presentation of climatic indicators relevant to human discomfort
• Provision of information through electronic billboards installed at central municipality points
• Provision of advice to citizens (e.g. airconditioned public facilities)
MONITORING PILOT ADAPTATION PROJECT RESULTS

- Installation of sensors where the adaptation projects are implemented as well as to reference areas
- Telemetry for the continuous supply of data
- Presentation of real-time data and of historical time series through the URBAPROOF tool platform
Thank you for your attention!

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National Observatory of Athens, Greece

For more information please visit our website: urbanproof.eu/en/
or connect with us on social media: EUrbanProof @EUrbanProof