# Climate Risk Assessment in the Socially Vulnerable Communities of Aigaleo

*CLISTHENES*

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*Barcelona, 11, June , 2024*

The CLIMAAX project is funded by the European Union under Grant agreement ID 101093864.
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CLIMAAX
climate ready regions

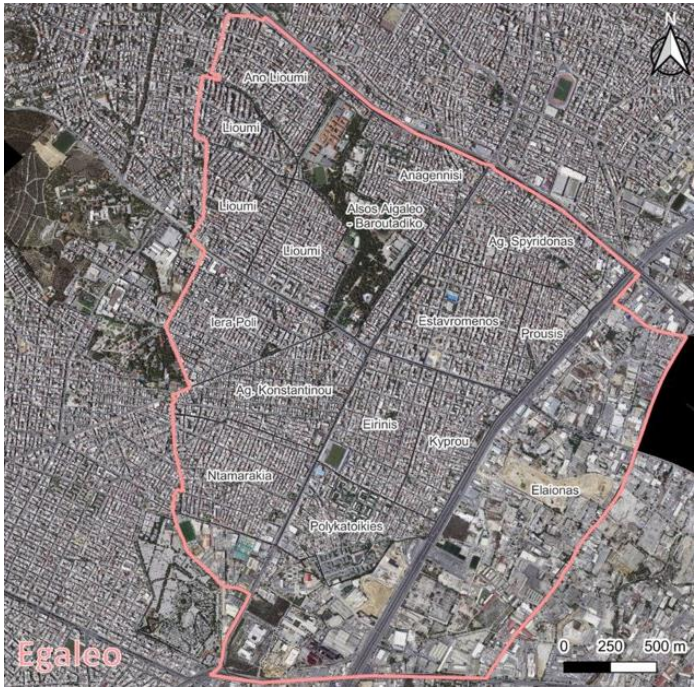
# Municipality of Aigaleo & scientific partner Demokritos

**Municipality of Aigaleo**

- A dense urban fabric of 100,000+ residents and limited green areas
- Aigaleo Grove is the largest green area in West Athens
- Metro access (3 stations), University of Western Attica
- **Municipal Priority axes**: Environment, Social Inclusion, Local Economy, Civic Participation
- Participation in **15+ EU projects** currently (e.g. TransformAr, Bin2Bean, RockTheBlock, C2IMPRESS, ClimateAdapt4EOSC etc) for climate & environmental resilience, social cohesion and participation

**National Center for Scientific Research *"Demokritos"* (NCSRD)**

- **Largest** multidisciplinary research center in Greece
- CLIMATE-EREL group: expertise in climate impact modelling, adaptation & mitigation
- Extensive work on local **climate services**, disaster management & EU frameworks
- **Strategic partner** in data analysis, workflow customization & capacity building

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# Climate, Environmental & Social Context

**Geographical Characteristics**:

- A **densely populated urban** municipality located in the metropolitan area of Athens. It features limited green spaces (Aigaleo Grove) and significant urban heat island effects.

**Climate and Environmental Challenges**:

- **Extreme** summer temperatures, often exceeding 40°C, exacerbated by climate change and urbanization.
- **Heatwaves** are of long duration and frequent, increasing the likelihood of **wildfires** and posing serious health risks and economic losses.

**Socioeconomic Context**:

- The area hosts a mix of **vulnerable populations**, including **low-income** families, elderly residents and migrant populations who are less equipped to handle extreme weather events.
- **Infrastructure** such as public cooling shelters and fire prevention systems is often inadequate for the growing demand.

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# Project Purpose, Objectives & Key Impact Metrics

**Purpose:**

- Deliver a **localized, inclusive and just** Climate Risk Assessment
- Refine the SECAP and produce a climate adaptation strategy

**Objectives:**

- The creation of a concrete, holistic and realistic climate **vulnerability assessment**
- **Identify inclusive and just** climate resilience adaptation measures, by leveraging engagement from citizens and especially vulnerable communities.
- Use of data extracted from the climate stations installed at key points in the city through the project TransformAr

**Key Impact Metrics**

**Social, economic & health Impact:**

- **Demographics** (age, sex)
- **Socioeconomic Status** (education, income, inequality, poverty, GDP/capita, rural population, Social Vulnerability Index (SoVI))

**Impact on Buildings and Infrastructures:**

- **Building** physical **characteristics** (construction material, size, height, age, use and contents)
- **Road networks** from Open Street Map (OSM) data (e.g. a proxy of the proximity of roads to wildland areas outside of urban centers)

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# Work completed so far



**Implementation of the 1st phase of the project:**

- Climate **risk** scoping and **stakeholder** mapping
- Installation and integration of **local climate station data**
- Application of **EuroHEAT** & **FWI** workflows, for heatwaves and wildfires
- Preliminary results: to be updated with the l**ocalized data** from ELSTAT (Hellenic Statistical Authority)
- **20** municipal and NCSRD staff members trained on workflows
- **Monthly** focus groups with the municipal stakeholders and the project team, evaluating the procedure
- **5 new climate indicators** related to vulnerable communities identified

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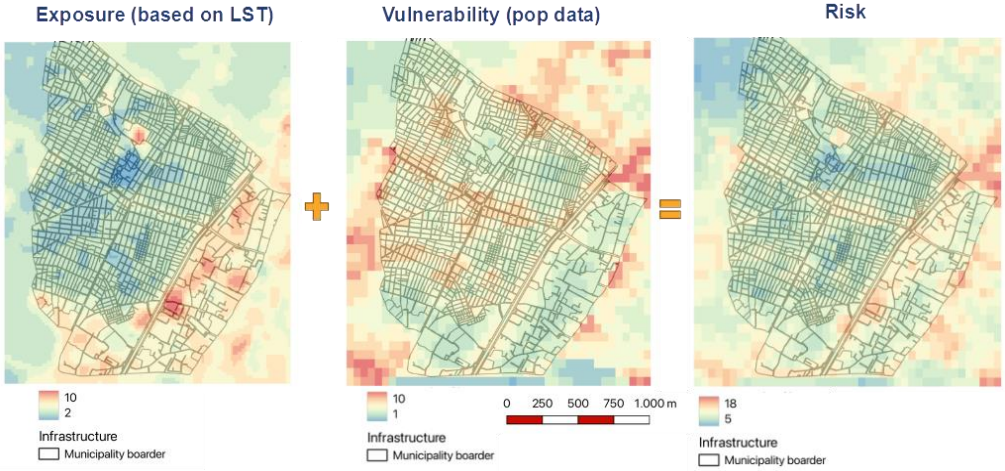
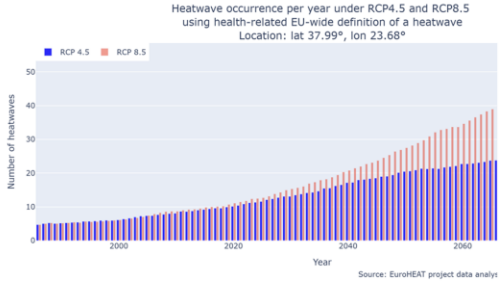
# Heatwave Workflow – Application & Results

- Workflow: EuroHEAT – modeling historical (from 1985), present & future (until 2085) under RCP4.5 and RCP8.5 scenarios
- Key findings:
  - Up to **140% increase in heatwave frequency** (for RCP8.5 2016-2045 scenario compared to 1986-2015 period)
  - **Hotspots**: Petrou Ralli, Athinon Ave., Kifissos Ave.
  - High resolution population and vulnerable groups data (based on Worldpop and Proxy information) **do not** reflect the actual condition.
  - The **intensity** and **duration** of the heatwaves are not included at the analysis
- Importance of **validation** with local climate **stations** and **building-level data**

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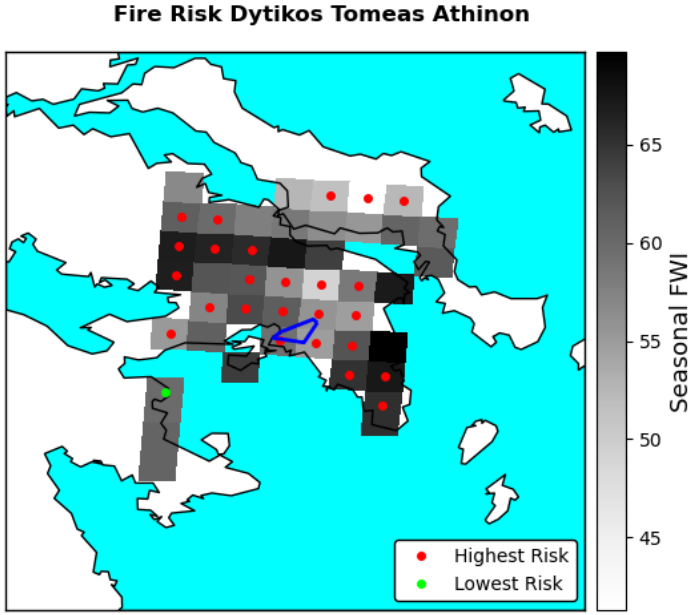
# Wildfire Workflow – Application & Results

- Workflow: **Fire Weather Index (FWI)**
- Key findings:
  - **High wildfire risk** for 2045–2054 (esp. Mount Aigaleo area)
  - Population & infrastructure in WUI zones
  - Limited vegetation mapping precision = challenge
- **Integration** of land use, road data, and socioeconomic vulnerability.
- Available data have **low spatial resolution** (12km) for the AGL case.
- Geographical distribution of **seasonal FWI** (colors) and **Fire Risk** (red and green dots) for the period 2045-2054, based on RCP4.5 over the greater area of Attica. The **blue frame** includes Dytikos Tomeas Athinon,, where Aigaleo is located.

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# Usability, Stakeholder Engagement & Next Steps

***Usability:***

**Approachable, Sustainable Climate-proofing of Critical Services:**

- **measures** and applicable **actions** to safeguard municipal infrastructures from environmental severity
- gradually reduce **energy** consumption.

**Just and Inclusive Transition to Climate Resilience:**

- understand the **specific needs** and intervention gaps for communities and vulnerable populations.

**Utilizing Innovative Solutions to Foster Citizen Engagement and Climate Awareness:**

- upgrade and utilize the citizen **awareness app** produced in the context of TransformAr project as an official city tool to engage local population

**Integration of findings into SECAP revision**

- a novel and reinforced methodological framework to strategize key climate resilience topics by involving **inclusion and sustainability measures**

***Stakeholder Engagement_1st phase:***

- **Municipal stakeholders:** Social Services, Civil Protection, Municipal Police, Technical Services, Education
- **Scientific stakeholders:** NCSR Demokritos
- **Non-Govermental Stakeholders:** Association of Parents and Guardians, NGO for Disaster Management of Aigaleo, Cultural Associations

***Next Steps:***

- Integration of the localized data (from ELSTAT) to the workflows Monthly focus groups with local stakeholders to evaluate the progress of the project
- Participatory Design Workshop with the community at the end of the 2nd phase
- Enhancement of the cross-departmental collaboration
- Awareness communication materials of the results of the workflows

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# Reflections- Local Data & Limitations

- **WorldPop** data do not match actual population density and vulnerable population groups.
- Need of access to **local** social and economic data by local authorities.
- Need for **higher** resolution data. **FWI** methodology uses dataset with resolution much coarser than the area of Aigaleo.
- The **heatwave** workflow is based on the relative scaling of the different dimensions used and therefore does not facilitate the **objective** comparison of the results.

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# Closing Thought

***The importance of local data***

*What forms of local knowledge or citizen-generated data could be formally incorporated into climate risk workflows to improve their relevance and fairness?*

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