

Action title:

FAIR NEtwork of micrometeorological measurements

Action No.: **CA20108**

Acronym: **FAIRNESS**

Action chair: Branislava Lalić

WP No: **2**

WP leader: Mark Roantree

Deliverable writers: Elke Eichelmann (Ireland)

Deliverable: **D2.3 – Report on selected pilot data sets and indices (M15)**

Date: **14.01.2023.**

D2.3 REPORT

Activities that have been undertaken to achieve the deliverable D2.3 are:

1) Design of pilot data sets (using partner data sources) for rural and urban microclimate including metadata (https://www.fairness-ca20108.eu/micromet_ksp/ & <https://docs.google.com/spreadsheets/d/1PiufqHolelvH7YoSVshS4o73b9hZkIYROIYS1q0bVJk/edit#gid=1403729417>)

2) Creation of the questionnaire

A questionnaire was designed in September 2022 which was distributed at the workshop and MC meeting in Riga 26-28 September 2022 and again in April 2023 at the General Meeting in Smolenice and via email to all COST members on both occasions.

The survey can be accessed at the following link: <https://forms.gle/FFcj9RRqNj9F1tVR8>

Survey participants were first asked to describe in what way they are currently using micrometeorological data in their research including indices calculated from measurements.

Following this participants were able to name up to 6 specific indices and list further details like references and methods for each.

The survey received 13 responses listing the following indices (some were mentioned multiple times)

- General climate indices:
 - ↳ UTCI (Universal Thermal Climate Index);
 - ↳ UHI (urban heat island) index
- ET/water/drought related indices:
 - ↳ ET (actual remote sensed) or ETo using Penmann Monteith equations;
 - ↳ CWSI (Crop Water Stress Index);
 - ↳ Reference evapotranspiration;
 - ↳ SPIE (standardize precipitation-evapotranspiration index);
 - ↳ SPI drought index; SPI Standardize precipitation index;
 - ↳ WUE (Water Use Efficiency)
 - ↳ R1 (Daily afternoon average relative humidity)
 - ↳ R2 (Saturation water vapour at minimum daily temperature over saturation water vapour at maximum daily temperature)
 - ↳ AMI (Agrometeorological Indices describing number of dry days):
 - ✦ dry start (Dstart) — actual/reference evapotranspiration < 0.5; dry intensive (Dintensive) — actual/reference evapotranspiration < 0.4; dry extreme (Dextreme) — actual/reference evapotranspiration < 0.3; dry very extreme (Dvextreme) — actual/reference evapotranspiration < 0.2.
- Temperature related indices:
 - ↳ Tmrt (mean radiant temperature);
 - ↳ PET (Physiologically Equivalent Temperature);
 - ↳ Monthly average of daily minimum/maximum/average temperature;
 - ↳ PT (perceived temperature);

- ↘ DTRT (Normalised daily temperature range)
- ↘ AMI (Agrometeorological Indices relating to days with extreme temperatures):
 - ✦ arctic day—day with minimum daily temperature below -20°C ; freeze day (FreezD)—day with maximum daily temperature below 0°C ; frost day (FrostD)—day with minimum daily temperature below 0°C ; summer day (SumD)—day with maximum daily temperature above 25°C ; tropical day (TropD)—day with maximum daily temperature above 30°C .
- Vegetation related indices:
 - ↘ GDD (Growing Degree Day);
 - ↘ start and end of growing season;
 - ↘ NDVI

Several of these indices were subsequently selected to be applied on the pilot data sets and case studies, such as Tmrt and PET in CS1 and R1 in CS2.