Using FOSS4G to meet UN Sustainable Development Goal (SDG) targets

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Why FOSS4G?
Linking Research & Teaching

- A focus on learning GIS through 16 real world case studies.
- An introduction to an open-source software that can be used beyond the classroom.
- Analyzes Sustainable Development Goals in a global framework and provides an alternative approach to learning GIS.
- Supports both secondary and tertiary educators and improves GIS education at all levels.
- Contains a holistic range of case studies that extend across several disciplines, from geography education, environmental sciences, geosciences, natural sciences, social sciences, and digital humanities.
Two Case Studies

SDG13 proposes urgent action to combat climate change and its impacts, with target 13.3 to improve education, awareness raising, and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning.

SDG11 proposes to make cities and human settlements inclusive, safe, resilient and sustainable, with target SDG11.2 to provide access to safe, affordable, and sustainable transport systems, with specific attention to the needs of those in vulnerable situations, including women, children, persons with disabilities and older persons.
Climate Risk

Met Éireann funded project TRANSLATE, developing new climate projections and open-source methods for quantifying climate risk at a national level

O’Brien & Nolan 2023
Step 1: Identify & Generate Hazard Indicators from climate projections

Step 2: Identify & Source Geospatial Variables of Exposure and Vulnerability Metrics

Step 3: Builds the Analytical Grid to Undertake Risk Analysis

Step 4: Aggregate the Hazard, Exposure, and Vulnerability Data to the grid

Step 5: Index the Hazard, Exposure, and Vulnerability and Calculate Indicative Risk

Step 6: Calculate Risk across Climate Scenarios and Time Scales
<table>
<thead>
<tr>
<th>Climate</th>
<th>Hazard Indicator</th>
<th>Derived</th>
</tr>
</thead>
<tbody>
<tr>
<td>Atmospheric</td>
<td>Pressure</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Ultraviolet radiation levels</td>
<td>✓</td>
</tr>
</tbody>
</table>

**Precipitation**
- Wet Days
- Very Wet Days
- Met Éireann Yellow Warning Days - Rain
- Met Éireann Orange Warning Days - Rain
- Met Éireann Red Warning Days - Rain
- Met Éireann Yellow Warning Days - snow
- Dry periods
- Humidity
- Met Éireann Drought - Absolute Drought
- Met Éireann Drought - Partial Drought
- Agricultural drought risk (SPI)
- Agricultural drought risk (SPEI)
- Potential Soil Moisture Deficit
- Potential evapotranspiration (PET)

**Temperature**
- Heat-stress Days (Maximum Temp, Days over 30°C)
- Met Éireann Yellow Warning Days - Low Temperature/Ice
- Met Éireann Orange Warning Days - Low Temperature/Ice
- Met Éireann Red Warning Days - Low Temperature/Ice
- Variability in temperature
- Met Éireann Yellow Warning Days - High Temperatures
- Met Éireann Orange Warning Days - High Temperatures
- Met Éireann Red Warning Days - High Temperatures
- Summer days
- Heat Wave Index
- Heating degree days
- Met Éireann Drought - dry spells
- Cooling degree days
- Tropical nights
- Growing degree days
- Shade temperatures
- Shade temperatures

- Code developed in open-source Python code for ~14 climate hazard indicators
- Infrastructure in place to tweak values to sector specific thresholds

# Extreme Rain Days 1976-2005
Infrastructure / Tools developed to aggregate zonally any spatial dataset
Post-Primary Schools | Aggregate to Grid | Total Schools | Total Enrolment | Enrolment Index
• Identification of areas where risk of missed education increases or decreases based on changing climate hazards

• Able to identify which schools are projected to have the largest changes under future climate scenarios, which could be used to mitigate the impacts of climate change

• By spatially linking schools to climate risk, we increase awareness of the changes under climate scenarios, supporting SDG13.3

• Focusing on just precipitation, schools in Tralee & Donegal see the highest mm increase in rainfall
What is the best route to take FOSS4G?
Towards people-centric smart city development: Investigating the citizens’ preferences and perceptions about smart-city services in Taiwan

Tingting Ji, Jieh-Haur Chen, Hsi-Hsien Wei, Yu-Ching Su

ABSTRACT
Cork women’s fear of violent crime is found to have a strong spatial expression but it is also seen to be variable with social context. Patterns of Fear of Violent Crime (FOVC) in the city centre are outlined and some social complexities are considered. A conceptualisation of passive and reactionary FOVC is not favoured. Rather, following Koskela’s (1997) consideration of ‘bold women’, consideration is given to whether these patterns may point to a more proactive negotiation of such feelings in context.

Key index words: Women, Fear of Violent Crime, Cork.
What is the best route to take to the train station in Edinburgh?
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What is the best route to take to the train station in Edinburgh?
All work represents collaborations with Paraic Ryan, Parvaneh Nowbakht, Chris Phillips, Jingyu Wang, Enda O’Brien, Paul Nolan, Lucky Ikani, Liam Coakley, and James Fitton.

Met Éireann TRANSLATE Project

UCC CACSSS Research Support; Taylor & Francis

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FOSS4G to support the SDGs
7th September 2023
FOSS4G:UK Local 2023 - Maynooth