



Geospatial and ICT data, technologies and skills for sustainable social innovations

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Transformative change happens in the social matrix,
where local power combines with tech potential

"New generation university graduates need to be competent with novel technologies, but equally they need to master the interface between technologies' potential and societies' emerging needs"



OPEN GEOSPATIAL DATA
AND TECHNOLOGIES AS
TRANSITION **ENABLERS**

**SUSTAINABLE
LOCAL SOLUTIONS**
WITH LIFE-QUALITY IMPACTS

TRANSFORMATIVE
SPACE FOR
INNOVATIONS

NEW GENERATION
GEOSPATIAL **EXPERTS**

**DIGITAL RESEARCH AND LEARNING
ENVIRONMENTS**

Social innovations in Geo-ICT education at Tanzanian HEIs for improved employability (GeoICT4e, 2020-24)

Ardhi University (ARU)
University of Dar es Salaam (UDSM)
Sokoine University of Agriculture (SUA)
State University of Zanzibar (SUZA)
Moshi Co-operative University (MoCU)

University of Turku (UTU, Finland)
Turku University of Applied Sciences (TUAS, Finland)
Novia University of Applied Sciences (NOVIA UAS, Finland)

Institutional education capacity building cooperation between 5 Tanzanian and 3 Finnish Higher Education Institutions (HEIs)



The mission
Resilience Academy (RA) is the World Bank led university partnership and service delivery program aiming to improve digital skills, competences and employment of the African youth for more effective disaster risk management and climate resilience

Geospatial and ICT skills and competence development through institutional research, education and development cooperation between Finnish and Tanzanian universities (since 2003-, <https://tanzania.utu.fi/>)

University partnership and service delivery to improve digital skills, competences and employment of the African youth for more effective disaster risk management and climate resilience (since 2018-, <https://resilienceacademy.ac.tz/>)

Innovations for sustainable development"



Students are able to design climate-smart and resource-efficient solutions for social, environmental and economic sustainability and improved resilience

Climate, sustainability and resilience skills

Geospatial data and technology skills

Students are able to use digital geospatial data and open-source geo-ICT technologies in a novel and need-based manner

Students are capable of solving real, complex spatio-temporal problems of the surrounding society and in relation to the challenges presented for them

Theme-specific problem skills in space and time

Students' competences develop via **co-creative learning spaces** organized in close cooperation with the innovation ecosystem actors and problem owners.

Entrepreneurial and innovation skills

Students are able and professionally confident to work in teams towards innovative, contextually relevant and influential solutions

What transformative spaces
have we co-created in GeoICT4e
and Resilience Academy for
social innovations?

Resilience Academy Data Visualization Challenges



<https://resilienceacademy.ac.tz/datviz>

2019 statistics



260

The Statistics

**Student participants
applied for the challenge**

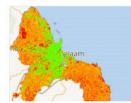
107	Ardhi University	68	State University of Zanzibar
29	Sokoine University of Agriculture	55	University of Dar es Salaam
01	Mwalimu Nyerere Memorial Academy		



Climate Risk Database (CRD) as a community maintained open data service

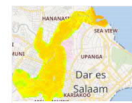
<https://geonode.resilienceacademy.ac.tz/>

The screenshot shows the top navigation bar of the Resilience Academy website. It includes the Resilience Academy logo on the left, followed by menu items: Layers, Thematic Maps, Resources (with a dropdown arrow), and Community (with a dropdown arrow). On the right side of the navigation bar are links for Register and Sign in. Below the navigation bar is a large banner image showing an aerial view of a city with greenery. Overlaid on this image is the text "Climate Risk Database" in a large, bold, white font, and below it, in a smaller white font, the tagline "The catalyst for resilient urban development in Tanzania". At the bottom of the banner area, there are three white icons on a blue background: a diamond shape representing layers, a location pin representing maps, and a person icon representing community. Below each icon is a white text label: "115 Layers", "6 Maps", and "341 Community".



 Dar es Salaam Land Use and Land Cover of 2016


The prototype high resolution land cover map at 20-metre resolution is based on Sentinel Imagery observations. The main objective of the map release is to collect users feedback for



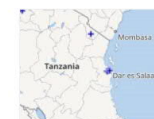
 Msimbazi Digital Elevation Model, UAV 2019

A Digital Elevation Model of the Msimbazi River. It has a spatial resolution of 0.50 m and is based on Imagery collected with a photogrammetric drone. Horizontal datum: WGS84 UTM 37S



IMAGERY BASE MAPS EARTH COVER
 Drone images for lower Msimbazi Valley

Drone images for lower Msimbazi Valley



 Dar es Salaam Hydro-Met Stations

This layer contains the locations of hydro-meteorological TAHMO stations (ATMOS-41), Sommer RQ-30 Sensor and Ijinus Ultra-SonicWater level Sensors. Each station collects

Smart phones and mobile apps enable students to collect missing data: example of State University of Zanzibar student interns in 2019

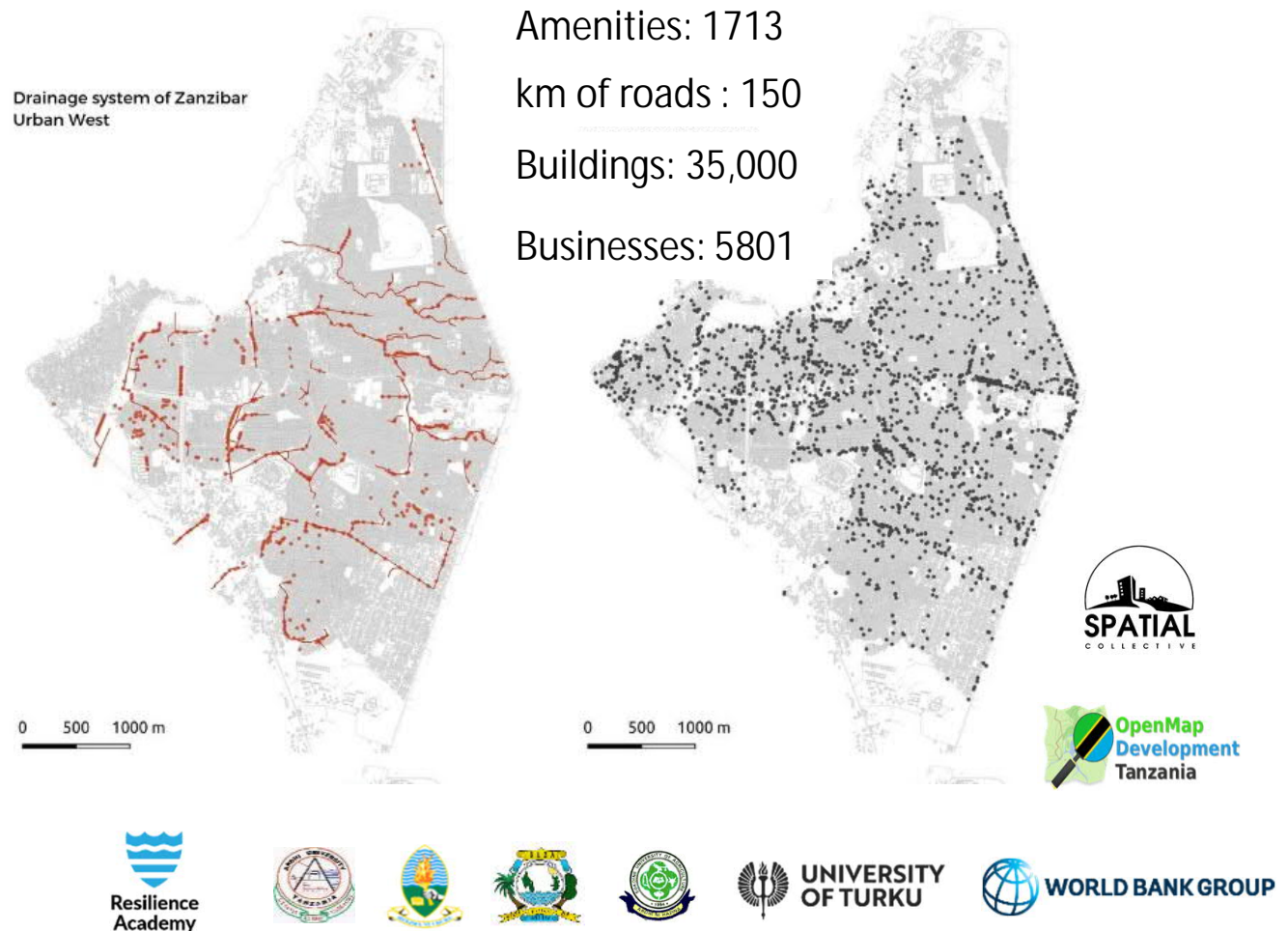
Students: 50

Time: 8 weeks

Municipalities mapped: 42

Community members: 300+

Skills obtained:



Cloud platforms as learning spaces of data science skills



Collect

Easy and flexible survey design and data management



Collect Mobile

Intuitive data collection and validation in the field



Collect Earth

Innovative land assessment through freely available satellite imagery



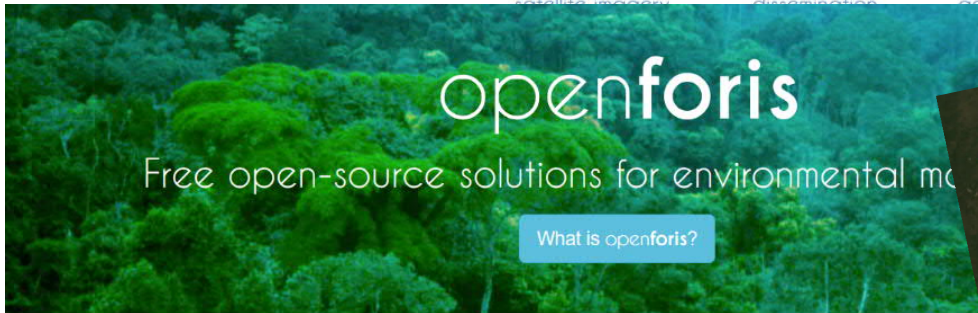
Calc

Efficient and collaborative data analysis and results dissemination

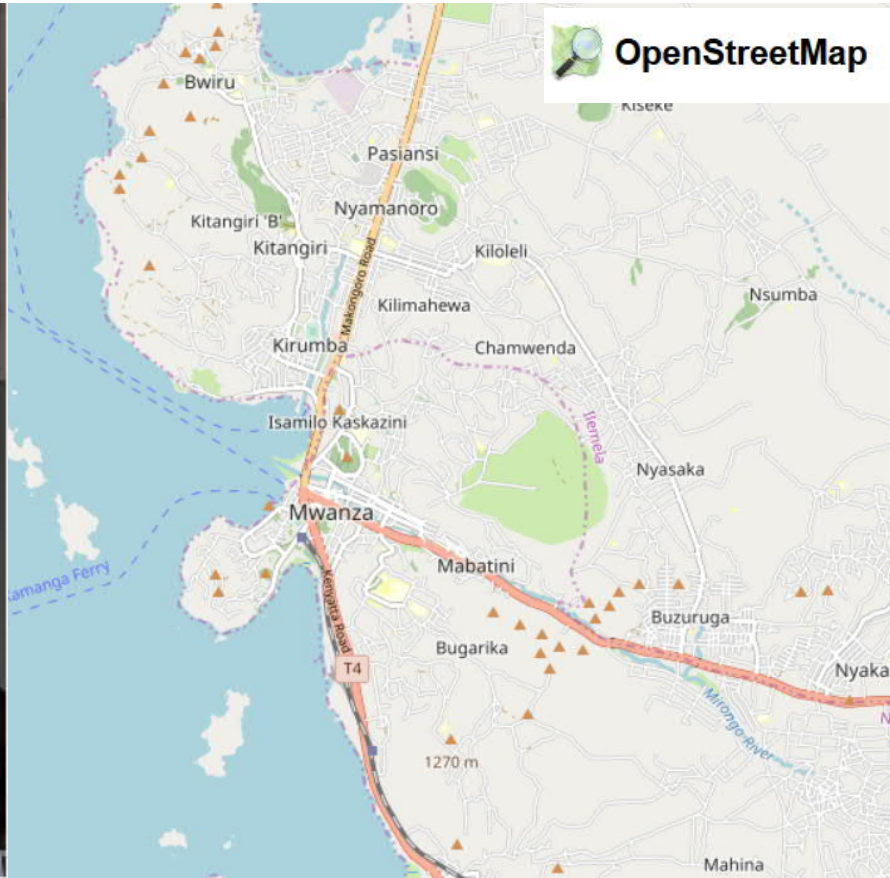


Geospatial Toolkit

Powerful command-line utilities for processing geospatial data



A planetary-scale platform for Earth science data & analysis
Powered by Google's cloud infrastructure

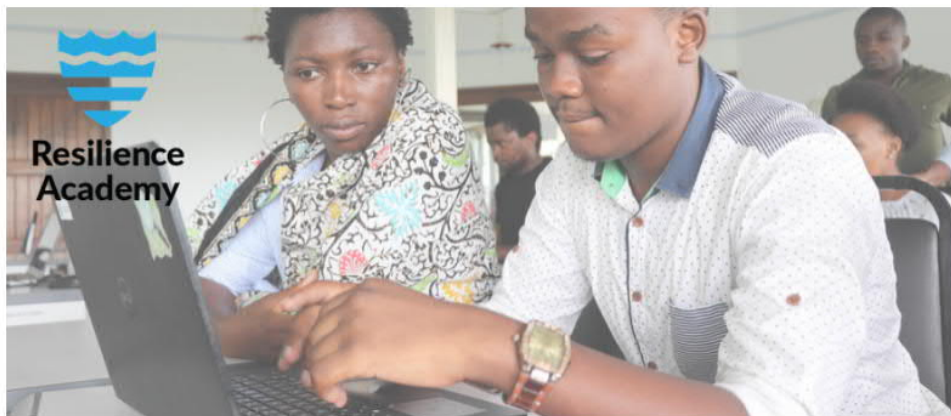
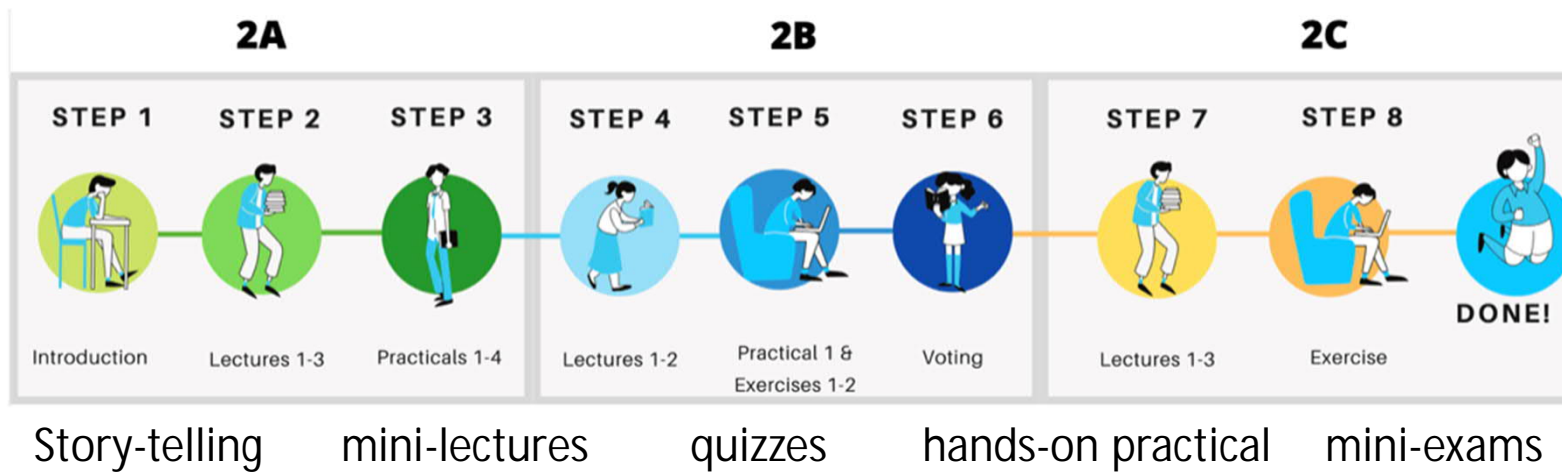


Mapathons as virtual learning and community action events

SANORD Webinar 2021 "Innovations for sustainable development"



Mini-MOOCs as open-access virtual learning environments



Welcome to module 2!

This is the second module of the Open Data for Resilience -theme. In here, we dive deep to the topics of data quality, metadata and data sharing, via interesting practicals and the supporting background theory. Stories, quizzes and reading materials help you to get closer to the subject and feel motivated through this online module.

<https://digicampus.fi/course/view.php?id=493>

"Innovations for sustainable development"

THEME 1: OPEN DATA FOR RESILIENCE

MODULE 1

Geospatial Content Management System – Geonode (3 ects)

This module aims to provide knowledge and practical experiences on principles, skills and practices on the Geonode Platform. It starts from the installation, usability and maintenance of Geonode to administration and customising the platform.

MODULE 2

Geospatial Data Quality and Management (2 ects)

This module aims to provide knowledge on principles, critical skills and good practices of geospatial data management and dissemination. The module includes information and methods on data description, maintenance, updating, quality assessment, and data sharing through an SDI, Geonode

MODULE 3

Geospatial Data Visualisation (1-3 ects)

This module includes geovisualisation principles, tools and methods. Students learn geospatial data visualisation principles and practical skills through an (Urban) Resilience Visualisation Challenge based on real visualisation needs coming from the actors.

1 *"Digital data, teach and online learning tools are widely available, but only their successful 'localization' brings true impacts"*

2 *"Participation and community-driven actions generate genuine ownership and resilience to learning and local impacts"*

Reflections

3 *"Magic often happens outside the comfort zone – what is our capacity to take risks and innovate?"*

4 *"Success paths lie beyond any single project or initiative – how can we facilitate integration of actions for larger impacts?"*

Questions & discussion

<https://tanzania.utu.fi/>
<https://www.geoict.org/>
<https://resilienceacademy.ac.tz/>
<https://geonode.resilienceacademy.ac.tz/>

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