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# Geospatial Technology in Sustainable Cities and Communities: Introduction to the Special Issue

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# Geospatial Technology in Sustainable Cities and Communities: Introduction to the Special Issue


## Abstract

This special issue aims to demonstrate how we could leverage geospatial technology for sustainable cities and communities. Contributions on a wide range of geospatial technologies (e.g., GIS, remote sensing, spatial statistics, photogrammetry, and geomatics) as well as issues addressing better cities and communities for a sustainable future are encouraged. This issue contains selected papers from the 7th International Conference on Geomatics and Geospatial Technology (GGT) 2021, which took place in Kuala Lumpur, Malaysia, on 24th March 2021. The five articles selected for this special issue demonstrate how geospatial technology can be used to create more sustainable cities and communities. The diverse applications of geospatial technology were demonstrated in each manuscript, sending a clear message that geospatial technology goes beyond visualization and incorporates intelligence and analysis to provide you with geospatial solutions.



## Keywords

Geospatial, Environment, Sustainable Development

## 1. INTRODUCTION

Cities worldwide are spatially stretching at a much faster rate than population growth as a result of increasing urban migration (Angel et al., 2011). Urbanized land covers approximately 1% of the Earth's land surface based on its built-up area (Liu et al., 2014; Zhou et al., 2015). Given the scarcity of land and soil, increasing urban migration and urbanisation have undoubtedly put pressure on state and local governments worldwide in determining the most appropriate land use for housing, transportation infrastructure, and arable land. Malaysia's trees developed green spaces, and natural areas will face direct and indirect consequences of a changing climate in the twenty-first century. Thus, conducting vulnerability assessments is a critical step toward understanding the potential impacts of climate change on the urban forest, the level of resilience, and the adaptive capacity of cities. The responsible authorities must make a significant effort. They must strategically plan the urban land area and distribute investments across small areas in order to benefit a sizable proportion of urbanites (Clinton et al., 2018). Despite numerous efforts to make cities and communities smarter, the SDGs will only be achieved through holistic transformative changes that communicate the interconnections between natural resources, human adaptation, science, and technology. One must recognise and balance the critical roles of our societies and the balance of biodiversity in order to achieve the global goals. Numerous studies have been presented to demonstrate to the world community the critical nature of environmental stewardship, and even recent studies on the interactions between the SDGs identify biodiversity conservation as one of the most powerful levers for achieving sustainability (Obrecht et. al., 2021). This issue contains selected papers from the 7th International Conference on Geomatics and Geospatial Technology (GGT) 2021, which took place in Kuala Lumpur, Malaysia, on 24th March 2021. Five articles have been published demonstrating how geospatial technology can be used to create more sustainable cities and communities.

## 2. GEOSPATIAL TECHNOLOGY IN PRACTICE FOR A SUSTAINABLE FUTURE

Nurul Idris, Nur Afiqah Ahmad Bakhtiar, and Mohamad Hafis Izran Ishak present GIS-based travel time analyses for children enrolled in the Special Education Integrated Program (SIEP). Their findings indicate that a small group of special-need students travels more than 20 minutes to school, exposing them to numerous threats (mental, physical, etc). The effects of the lengthy commute to school could be investigated further, as these children are vulnerable, and any detrimental effect on their mental, emotional, or physical development must be addressed. https://dc.uwm.edu/ijger/vol8/iss2/1/

Nafisah Khalid, Maisarah Abdul Halim, and Siti Nur A'tirah Shahimi evaluated the accuracy of the ASTER and SRTM Digital Elevation Models (DEMs) for watershed delineation in Johor State, Malaysia, by comparing the output to the Department of Irrigation and Drainage-defined watershed. Technical evaluations of both ASTER and SRTM reveal remarkable agreement and promising results. This finding is critical in addressing city areas that experience flash flooding following rainstorm events, and early and rapid mapping may assist the local government in strategizing and possibly avoiding massive damage to urban dwellers and infrastructure. https://dc.uwm.edu/ijger/vol8/iss2/2/

On the other hand, Nurfadhilah Ruslan, Nabilah Naharudin, Abdul Hakim Salleh, Maisarah Abdul Halim, and Zulkiflee Abd Latif investigated indoor walkability using the GeoSLAM ZEB REVO portable mobile mapping scanning system. This study identified a cost-effective alternative data collection strategy for the narrow and inaccessible space that does not jeopardise data accuracy. Addressing walkability is critical for urban climate, as it is another way to promote a healthy lifestyle and public transportation use among city dwellers. Additionally, given Malaysia's climate, pedestrians are more likely to walk indoors than outdoors. https://dc.uwm.edu/ijger/vol8/iss2/3/

Irwan Gumilar, Brian Bramanto, Rifky Yusuf Ananta, Dwi Haryanto, Hasanuddin Zaenal Abidin, Surono Surono, and Nobuhiro Kishimoto evaluated the performance of the Global Navigation Satellite System (GNSS) augmentation system for the Real-time Precise Point Positioning (RTPPP) method in Indonesia. The Quasi-Zenith Satellite System (QZSS) is used to evaluate the vertical and horizontal accuracy performance by utilising the capability of correcting measurements using precise ephemeris, clock, and other augmenting corrections. Based on a two-day comparison of QZSS-RTPPP and DGPS-Veripos measurements, the study concludes that the QZSS-RTPPP method has a sufficiently stable precision and mapping accuracy level. However, accuracy and precision were still lower than those obtained using the DGPS-Veripos technique, indicating the need for additional research. https://dc.uwm.edu/ijger/vol8/iss2/4/

Ainyyafiatty Arifin and Nor Aizam Adnan compared the multi-sensor active and passive remote sensing technologies of Landsat 8, Sentinel 1 and 2 satellite data in lineament mapping between the states of Selangor and Pahang in Peninsular Malaysia using automatic image processing tools. Previously, geological lineaments were mapped using traditional field work. This study proposed automatic lineament extraction techniques that are faster than semi-automatic and manual approaches because the lineament detection algorithms are integrated into the software. Lineament mapping is critical for many studies of urban natural disasters, such as landslides, and it is a necessary component of any structural geological investigation. This discovery improved the efficiency of the mapping process, allowing the local council to make an informed decision. https://dc.uwm.edu/ijger/vol8/iss2/5/

## 3. A COURSE OF ACTION

This issue serves as a springboard for discussing the strategic steps necessary to achieve sustainable cities and communities, as well as the implications of numerous variables such as climate change, social problems, the economic front, and urban adaptation capacity. The global community now recognises the potential for earth observations and geospatial information to serve as critical inputs to achieving the SDGs as we work to build a more intelligent and sustainable future. Future research should focus on the miniaturisation and mobilisation of such technologies in conjunction with the industrial revolution, as well as the development of web-enabled systems that enable dynamic and real-time location-based analysis. Researchers should be able to keep up with the rapid advancement of IOT technology.

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