

IGU-YECG SPECIAL ISSUE: GEOSPATIALITY AND SUSTAINABLE DEVELOPMENT GOALS

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ABSTRACT. The rapid human development and the conflicts between society, economy and environment has greatly hindered the implementation of sustainable development strategy. The '2030 Agenda for Sustainable Development' and the Sustainable Development Goals (SDGs) provides a universal framework for addressing the issues identified in previous development agendas and achieving policy goals in social, economic and environmental spheres. However, the governments and decision-makers across the world have been facing challenges related to monitoring and assessing the progress of SDGs. The use of geospatial science and spatial data architectures can address these challenges and support holistic monitoring and evaluation of SDGs. This editorial paper discusses the role of geospatial science in implementation of SDGs by drawing on the scholarly works published in the special issue titled 'Geospatiality and Sustainable Development Goals'. The issue provided a platform for research publications by young and early career geographers from across the world. Several papers in the issue were drawn from different IGU conference sessions organised by the IGU-Task Force for Young and Early Career Geographers (IGU-YECG) since from its establishment (Beijing, 2016) to the upcoming 34th IGC at Istanbul (2021). By bringing the debates on SDGs to the forefront explicitly, this editorial paper reinstates interest in the topic.

KEY WORDS: Geospatiality; Sustainable Development Goals; COVID-19; Urbanisation; International Geographical Union

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INTRODUCTION

The rapid human development and the contradiction between society, economy and environment has greatly hindered the implementation of sustainable development strategy (Zhao and Wu 2019). In order to draw more attention on sustainable development from different actors, the United Nations has adopted the 17 Sustainable Development Goals (SDGs), 169 sub-goals and 232 targets at the United Nations Summit on Sustainable Development in 2015. Unlike the previous development agendas such as the Millennium Development Goals (MDGs), where the emphasis was on economic growth, the SDGs are a universal framework that contains many potentially diverging policy goals in the economic, social, and environmental sphere, while some goals are thought to be mutually supportive (Kroll et al. 2019). The SDGs also allows malleability between programs of environment and development; places from local to global; institutions of government, civil society and industry (Robert et al. 2005). Many experts and researchers have been making great efforts to monitor, assess and realise SDGs. For example,

while some researchers analysed the application of SDGs to ecology and environment (Salleh 2016; Yenneti et al. 2016), others applied SDGs to humanities and education (Chowdhury and Koya 2017; Sterling 2014). Yet there are many difficulties. There is a lack of awareness, understanding and uptake of geospatial information and spatial data architectures at policy and decision-making levels (Scott and Rajabifard 2017). The sheer volume of geospatial data, the different understanding of the SDG indicators, the lack of policy and guidance, the gaps in geospatial information can be further impediments to achieve the SDGs. Further, there are relatively limited studies that attempt to more holistically capture the varieties of geospatial factors and contexts behind the articulation of SDGs. There is a need to assess the trade-offs and synergies to meet the SDGs and fill the gaps.

In order to develop a vision for ensuring sustainable development, a discussion of the SDGs needs careful examination through new concepts, approaches and solutions to the problems. In particular, it is crucial to integrate and connect geospatial information with the global development agendas in a more holistic and

sustainable manner to monitor, measure and achieve the 17 SDGs, their 169 targets and the 2030 Agenda for Sustainable Development. Geospatial information has attracted widespread attention as a means to build a universal measurement and monitoring framework that can be applied across the world (Choi et al. 2016).

This special issue brings together integrated interdisciplinary and international studies on SDGs, monitoring and evaluation of SDGs, the use of different existing and emerging geospatial technologies in assessing challenges in implementation of SDGs, the social and gender dimensions in SDG research and other development-related themes. The use of geospatial programmes and data can help in analysing the social, economic and environmental benefits and costs of implementing different SDGs and inform scientific community, policy, industry and civil society (Moomen et al. 2019). The analysis, modelling and mapping of issues in implementation of SDGs can provide an integrative framework for global cooperation, collaboration and evidence-based decision-making (Scott and Rajabifard 2017).

The issue provided a platform for research publications by young and early career geographers from across the world. Several papers in this issue were drawn from different International Geographical Union (IGU) conference sessions organised by the IGU-Task Force for Young and Early Career Geographers (IGU-YECG) since from its establishment (Beijing, 2016) to the upcoming 34th IGC at Istanbul (2021). There is a cutting-edge research by young and early career scholars which deserves to be recognised and popularised. The special issue will enhance the understandings and conceptualisations of the interrelationship between geospatiality and SDGs. In particular, the integration of new geographies of theory, new conceptual vectors, innovative geospatial techniques and methodologies, the role of institutions, macro and micro level actors, policy options and effects, and governance and planning can be of significant value addition to the emerging literature on SDGs. The papers have addressed SDGs at the local, regional, and global scales, in various geographical contexts and across multiple dimensions (economic, social, political, developmental, and environmental). Interestingly, the intersectionality of COVID-19 pandemic has been contextualised with SDGs in some of the papers, which gave a greater nuanced approach to the special issue. The papers have adopted a relational perspective and showcased the conduits to address theoretical, methodological, and empirical issues in implementation of the SDGs.

SDGs and COVID-19 Pandemic

In the paper by *da Silva et al.*, the authors have assessed that the efficient and effective investment to meet Good Health and Well Being (SDG 3) and Clean Water and Sanitation (SDG 6) can be directly associated with the ability to successfully deal with the infectious diseases. Using the case study of Brazilian cities, a model is established for analysing the impact of compliance to SDGs in the fight against COVID-19. Likewise, *Bhattacharjee and Sattar* revealed that COVID-19 had differential impacts on different wards of Mumbai city which was associated with socio-economic inequalities prevailing in the city. Efforts are required to meet the targets of SDGs in order to minimise urban vulnerability.

Sustainable Urbanisation and Quality of Life

Cabrera-Barona and Cisneros have explained the effective implementation of forests (SDG 15) and water resources (SDG 6) which has a significant implication on achieving quality of life in Metropolitan District of Quito. The authors assert that better strategies are required to ensure that the participation of local governments in policy implementation is more meaningful. Similarly, *Aditya and Ningam* have measured the greenness of an Indonesian city by using the presence and distribution of urban tree canopy. Urban trees are essential to meet SDG 11: Resilient and Sustainable Cities, SDG 13: Climate Action and SDG 15: Life on Land. The residents of Indonesian city have poor access to urban greenery as the urban tree canopy is less than the UN thresholds. Marginal green cover can exert severe environmental impacts such as urban heat island (UHI), air pollution, and surface water run-off. There is a rapid expansion of urban built up and decline of agricultural land and vegetation in Fateh Jang, Attock, Pakistan as analysed by Tariq et al. using Land Use Land Cover (LULC) analysis that could be helpful in urban planning and design.

Kudryatvaseva et al. evaluated the population externalities in 114 cities of Russia across three dimensions viz., economic, ecological and social. The authors demonstrated that efficient city size in terms of population, environment management and changes in city area are crucial for achieving SDG 11 in Russian cities. While relating to SDG 11, *Raman et al.* have assessed urban traffic congestion and its impacts on the stakeholders in the context of Azadpur Mandi-Asia's largest vegetable and fruit market. The authors have concluded that there is huge congestion by vehicles from surrounding states of Delhi, lack of proper parking spaces and air pollution which makes the targets of SDG 11 unachievable in present circumstances.

Sustainable Consumption

Herron et al. explored the potential of green waste as an avenue for additional revenue generation for the City of Greater Geelong. The authors have used GIS technology and modelling software of Global Methane Initiative to undertake a series of simulations and determined the viability of anaerobic digester for the City of Greater Geelong. The authors proposed an innovative economic model to value the organic waste in the city and achieve Goal 12: Ensure sustainable consumption and production pattern. The mapping of groundwater potential zones by *Dwivedi et al.* is beneficial for sustainable groundwater management and planning and can contribute to SDG 6. The study used GIS and remote sensing and the integration of Analytical Hierarchy Process (AHP) technique to identify ground water potential zones in the Betul-Chhindwara region of Madhya Pradesh. Besides, agroforestry zoning is an important tool to monitor forest areas (SDG 15). In the paper on Mexico-Guatemala transborder region, *Daniel and Aristides* have applied spatial analysis and modelling to map homogeneous units for environmental planning.

Social Dimensions of Sustainable Development

Analysing the electoral participation of women in context of Patna, Bharti and Ghosh highlighted upon the gender and social dimensions of SDG 5. Increase in the temporal pattern of women's participation in elections is evident from the study; however, the growth rate of the

women voting percentage is less than that of men. This shows that women in the study area are being politically empowered. *Rajput and Arora* have measured and mapped food insecurity in Rajasthan in the context of SDG 2: End Hunger and Achieve Food Security. *Eremchenko et al.* assessed the least resource base in terms of minimum area and energy flow required to maintain long-term sustainable development of an isolated society.

CONCLUSION

The Special Issue highlights that it is important to render a multidimensional character to the debates on SDGs as the global cities and communities pose several challenges due to the existence of varied problems such as high

population density, poverty, climate change, pollution and infectious diseases. Additionally, it calls for localisation and co-creation of the SDGs; closer collaboration between local communities, civil society, governments and industry can be a good candidate for the effectiveness of SDGs. This should be complemented with better conceptual and empirical analysis of the implementation of SDGs across the biophysical, socioeconomic and institutional factors.

To conclude, despite the long term interest in investigating sustainability at different spatial levels, empirical studies on the geospatiality and SDGs are only emerging. By bringing the debates on SDGs to the forefront explicitly, the special issue has reinstated interest in the topic and provided a scholarly framework for policy on geospatial capabilities. ■

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