*Environmental Engineering and Management Journal*

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# COMPLEX ECOSYSTEM QUALITY OF GUANGDONG-HONG KONG-MACAO GREATER BAY AREA CITIES UNDER CARBON NEUTRALITY POLICY

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## Abstract

Global climate change is a transnational issue that requires the joint efforts of the international community. All the countries have been actively participated in reaching sustainable development goals and posing carbon neutrality policies. As an important engine for China's economic development, the sustainable development among cities in the Guangdong-Hong Kong-Macao Greater Bay Area is of significant importance for understanding the development model of economic agglomeration areas. Under the background of Carbon Neutrality policy, constructing a complex ecosystem evaluation indicator system, adopting 6 years' panel data, and examining the quality level of four subsystems—society, economy, resources and environment of GBA cities helps them identify their strong and weak sub-systems and further maintain a balance between Carbon Neutrality policy with their economic and social development. Results reveal that the quality of the overall complex ecosystem is affected most greatly by environment niche, and is different among GBA cities. In addition, the implementation of Carbon Neutrality policy among 6 of 9 cities has achieved initial satisfactory results for that after its declaration, their level of environment niche quality has been demonstrating a significant upward trend. However, since 2021, the overall economic and resources niche quality in some GBA cites start to go down and negatively correlated with environment niche quality. Therefore, the implementation of Carbon Neutrality policy might have a negative effect on the overall economic and social development among some GBA cities. By calculating the complex ecosystem conditions of the economy, society, environment, and resources in GBA cities, the study reveals how to achieve coordinated development of the economy, society, and environment in areas with high economic concentration. This research could provide certain reference for other regions or countries in promoting regional integration and sustainable development.

*Key words:* carbon neutrality policy, complex ecological system, environmental policy, sustainable development, the greater bay area cities

*Received: September, 2024; Revised final: March, 2025; Accepted: April, 2025*

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