Sustainable communities, while not explicitly defined universally, are now essential tools used by many countries to explore ways of enhancing regional sustainability, especially in China. 1 To reduce the burden on the environment resulting from economic growth and to examine effective social governance models, China launched the construction of the Comprehensive Experimental Community for Social Development in 1986, since renamed the China National Sustainable Community (NSC) in 1997. 2 Generally, NSCs are regions approved by the central government of China for exploring comprehensive solutions to various sustainable development challenges in the context of their development potential and to provide lessons for other regions, and they could be established in different administrative units such as cities or towns. 1, 3 It is estimated that more than 180 NSCs have been established in China. 1 Although previous studies showed that NSCs have a significant role in improving the sustainability of the region itself, 1 it remains unclear what impact NSCs have on the sustainability over a broader regional area, such as at the provincial scale. Answering this question would contribute to improving the evaluation and management mechanisms of NSCs and provide important lessons for how to manage sustainable communities around the world.

To fill this knowledge gap, we analyzed the relationship between the number of NSCs and the sustainability level at the provincial scale in China. Given certain limitations in data availability, we extracted data on NSCs, from the Evaluation Report on the Innovation Capacity of the China National Sustainable Communities in 2014, for 31 provinces in China (including autonomous regions and municipalities, but excluding Hong Kong, Macao, and Taiwan). 3 To characterize their sustainability level, we used the Sustainable Development Goal (SDG) Index calculated for each province in 2018 (Figure 1A). While applying the number of NSCs per province in 2014 to the SDG index in 2018 may seem inconsistent, the impact of NSCs upon local sustainability is usually a time-lag effect, i.e., it takes some time for the effects to manifest. Therefore, our analysis could be viewed as a crucial first attempt, one admittedly harboring some uncertainty, to nonetheless encourage more accurate analyses in the future as data availability and quality improves.

As Figure 1A shows, the existing NSCs are mainly located in the eastern and central provinces of China, these accounting for about 80% of the total number of NSCs, and the NSCs are mostly established at the county level (49%), followed by the urban district level (32%), the prefectural level (15%), and, in a few cases, the township level (4%). 3 Despite the trend of an increasing SDG index going from China’s northwest to its southeast, our regression analysis shows that the number of NSCs per province is not a significant predictor of the SDG index (R² = 0.03, p = 0.19) (Figure 1B). This implies that the NSCs may not be highly effective at increasing the sustainability level of provinces. For instance, despite having fewer NSCs, Beijing, Shanghai, Tianjin, and Chongqing all have a high SDG index (Figure 1A). Indeed, this may enhance the impact of NSCs’ contribution to the sustainability levels of provinces without considering those regions with greater development capacity such as municipalities, but this may overestimate the benefits of NSCs while ignoring their deficiencies. Even so, those provinces harboring fewer NSCs, such as Guangdong and Fujian, also feature a high SDG Index, which again emphasizes that the number of NSCs is likely not the only or main determinant of a province’s sustainability level.

Furthermore, by analyzing the linear relationships between the number of NSCs per province and their score for each SDG, our findings reveal that the number of NSCs in China significantly affected just three SDGs while having only weak and insignificant effects on the other 13 SDGs. Specifically, we find that China’s NSCs make a higher contribution to the improvement of SDG9 (“Industry, Innovation, and Infrastructure”) (R² = 0.27, p < 0.001), suggesting that provinces with a higher number of NSCs would improve more on indicators related to local infrastructure and technological innovation (Figure 1C). This was followed by SDG3 (“Good Health and Well-being”), which also received a significant yet smaller contribution from the NSCs (R² = 0.15, p = 0.018), suggesting that NSCs can also positively impact people’s local access to medical services and health security. This result might also be attributed to improved infrastructure promoting medical security. Conversely, Figure 1C indicates that the NSCs have had a significant negative impact on SDG5 (“Gender Equality”) (R² = 0.15, p = 0.017) and a negative but non-significant impact on SDG10 (“Reduced inequalities”) (R² = 0.01, p = 0.26). These findings deserve wider attention and scrutiny, as the NSCs might be more likely to gain financial support and attract more enterprises and talent, thus potentially increasing the imbalance or inequality of development across regions in China and perhaps elsewhere, too.

While China’s NSCs have had much success in improving local environmental and social governance, 1 we argue that overlooking the systemic linkages between the NSCs and other nearby regions may be the major reason why having more NSCs has been ineffective so far at improving the provinces’ sustainability. Previous assessments of NSCs were mainly based on indicators from their development plans, but these indicators tended to highlight the advantages of NSCs; hence, those results would typically show that NSCs were more sustainable than non-NSCs or would only reflect the ranking of different NSCs in terms of some aggregated index designed for assessing sustainability. 1 Nevertheless, the sustainability of a region is not entirely determined by itself but is rather an emergent property arising from a series of natural and social processes that interconnect different regions. 1 Linkages between different regions or sectors often have complex causality and non-linear characteristics and may even change differentially across spatial and temporal scales. 1 All the above factors constitute paramount challenges when trying to accurately measure the sustainability level of a region.

How the NSCs can be exemplified to enhance the sustainability of the broader region deserves more attention. From a socio-ecological systems perspective, human activities are a direct factor influencing regional sustainability. Changing human behavior by adapting management institutions to address divergent sustainable development challenges is a pivotal step toward ensuring regional and global sustainability. 2 Yet, institutional change involves diverse stakeholders, and regions that differ starkly in terms of geographical location or income level usually encounter varying challenges. Hence, adopting distinct but complementary development pathways could be an effective approach to enhancing sustainable management, which consists of structural, systemic, and capacity-building pathways. 3 Generally, the structural path focuses on macro-management policies and improvements in organizational structures to promote management efficiency and balance regional development. The systemic path emphasizes the relevance of scientific research in guiding institutional change, as it centers on understanding the complex linkages between different regions and sectors. Finally, the capacity-building pathway concerns the development and enhancement of both individual and group capacities, which should help develop more reliable methods for conducting sustainability assessments and contribute to the improvement of management institutions.

Subject to data availability and assessment methodology, we acknowledge the inherent uncertainty in the presented results. However, we aim to highlight that the construction of NSCs should not only focus on strengthening a region’s sustainability per se but also on their ability to contribute to the improved sustainability of the broader region. This means that a region’s sustainability ought to take into full account its various linkages with other regions, and this more holistic criterion should be considered an important element in future regional sustainability assessments. We advocate that applying structural, systemic, and capacity-building pathways to understand and address the challenges of sustainable development would enable the NSC concept to enhance sustainability for the broader region. However, which metrics are best suited to measure the linkages between NSCs and non-NSCs still requires careful deliberation.

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Does having more sustainable communities bring better sustainability?
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DECLARATION OF INTERESTS
The authors declare no competing interests.