引入多中心性以提升景观韧性

刘伟
国际应用系统分析研究所（IIASA）研究员、风险和韧性学部治理转型研究组组长；《景观设计学》期刊“多中心治理下的韧性景观”主题学术召集人

翻译 汪默英

摘要

景观是由人类与自然环境和建成环境共同组成的复杂适应性社会－生态系统，其为社会提供必要的公共物品和服务。面对快速的社会－经济、环境和政策变化和日益加剧的不确定性，塑造韧性已成为景观规划、设计和管理的首要目标。塑造景观社会－生态系统的韧性的关键性策略之一是建立适宜的治理形式，使系统可以有效应对和适应外部冲击和其他刺激。“多中心性”即是一种能够提升韧性的形式。通过分析不同的案例，我们证明了多中心性——无论是涵盖范围还是协作水平——有可能影响治理结果。而当前正是丰富我们的理论和方法论，提升驾驭景观社会－生态系统复杂性能力的最好的时代。

关键词

多中心性；景观韧性；适应性治理；复杂适应性系统

https://doi.org/10.15302/J-LAF-1-010002
收稿时间 RECEIVED DATE / 2019-06-30
中图分类号 / F205, TU986
文献标识码 / C

本文引用格式 / Please cite this article as:

Liu, W. (2019). Operationalizing Polycentricity for Landscape Resilience. Landscape Architecture Frontiers, 7(3), 8-11. https://doi.org/10.15302/J-LAF-1-010002

自工业革命以来，我们踏入了一个新的时代——人类世。从经济产出、科技进步和人均寿命方面来看，人类迎来了一个最好的时代，但同时也面临着前所未有的危机和挑战，包括环境污染、生物多样性丧失，以及贫困和不平等。人类社会和环境之间各个尺度上的复杂关联使人类面临的内部及外部不确定性也日益加剧[1]~[3]。

对于景观设计领域而言，现在或许是最好的时代。景观设计师开始关注从生态区域到全球尺度的议题（例如气候变化），并（像《新景观设计学宣言》所说）了解自身“同时深谙环境和社会系统……具有独特的优势，能将相关专业联合起来，形成新的联盟以应对复杂的社会和生态问题……以实现平等、可持续、韧性和民主为己任，通过艺术的形态和整体的功能联系，协同整合各种利益诉求、化解冲突”[4]。景观设计师有理由拥有如此宏大的愿景抱负。事实上，他们已经开始参与一些宏观尺度的工作——这一点在美国的“为了设计而重建”竞赛和中国的海绵城市建设上都可见一斑。这类工作多在“塑造景观应对外部冲击和其他压力的韧性”议题下进行，且通常与气候变化息息相关。但是，如果理想与现实之间的鸿沟不能被及时有效地填补[5]，现在就可能成为最坏的时代。为了避免这种情况发生，景观设计师需要掌握新的理论和方法论，其中之一便是从过时的生态系统稳定性观念转向复杂适应性社会－生态系统（SES）框架[3]。

在过去十年间，“韧性”（resilience）可以说是一个非常热门的话题，该词的谷歌全球搜索指数已超过“可持续发展”（sustainable development）（图1）。这很大程度上是因为全世界各个地区都在应对气候变化和重大自然灾害（如飓风卡特里娜、汶川地震、台风海燕、飓风桑迪等）的冲击。这也致使其很快成为景观规划、设计和管理的首要目标。景观可以被定义为由人类与自然环境和建成环境组成的SES。该系统能够满足社会和个人需求，例如提供必要的公共物品和服务等。景观韧性则是指景观这种SES抵抗、应对和适应，或在必要时主动转型，从而维持其主要功能，及其提供相应的景观服务以提高人类福祉的能力。景观韧性对于复杂的景观治理过程（即个人和/或集体在正式或非正式制度下的组织和自组织行为）而言，可谓是一种涌现现象。随着全球复杂性和不确定性日益加剧，建立更具适应性的治理体制对于塑造景观韧性而言至关重要[6]。

“多中心治理”通常与适应性治理密切相关[7]。2009年诺贝尔奖获得者埃莉诺·奥斯特罗姆对这一概念的推广起到了重要作用。许多学者都曾对多中心治理概念和理论的演变进行过综述，包括本期中的奥德·赞格拉夫–哈梅德等。应用多中心思维的主要障碍在于缺乏明晰的操作原则。这里需要厘清“多中心治理模式”（polycentric governance arrangement）和“多中心治理体系”（polycentric governance system）之间的区别[7]。简而言之，前者适用于描述性分析，即当决策团队中的各主体都具有实际意义上的自治权时，就可以说这种治理模式是“多中心的”；而后者则适用于规范性分析，即只有当各独立决策主体在认识和解决潜在的竞争和冲突方面表现出一定的凝聚力时，才能说其治理体系是“多中心的”[7]。

戴夫·惠特曼等[8]发现，虽然理论上多中心模式有助于适应性治理，但实际上，在应对不确定性方面，多中心模式并不总是优于单中心模式，例如在需要迅速决策的紧急情况下。克劳

OPERATIONALIZING POLYCENTRICITY FOR LANDSCAPE RESILIENCE

LIU Wei*

Research Scholar and Leader of Governance in Transition Research Area, Risk and Resilience Program, International Institute for Applied Systems Analysis (IIASA); Guest Editor of the issue themed on Polycentric Governance and Landscape Resilience, *Landscape Architecture Frontiers*

*Corresponding Author
Address: Schlossplatz 1, Laxenburg, 2361, Austria
Email: liuw@iiasa.ac.at

TRANSLATED BY WANG Moying

ABSTRACT

Landscapes are complex adaptive social-ecological systems that encompass human and natural and built environments, and provide essential public and common goods to societies. Facing fast socio-economic, environmental, and policy changes and increasing uncertainties, building resilience has emerged as a main objective for landscape planning, design, and management. A key strategy to make landscape social-ecological systems resilient is to form appropriate governance forms that can be responsive and adaptive to external shocks and other stressors. Polycentricity is such a form that has been proven to enhance resilience. By analyzing a variety of cases, it demonstrates polycentricity — both its breadth of inclusion and collaborative degree — can affect governance outcomes. This is the best of times to become more plural in theory and methodology in order to have a stronger capacity of navigating the complexities of landscape social-ecological systems.

KEY WORDS

Polycentricity; Landscape Resilience; Adaptive Governance; Complex Adaptive System

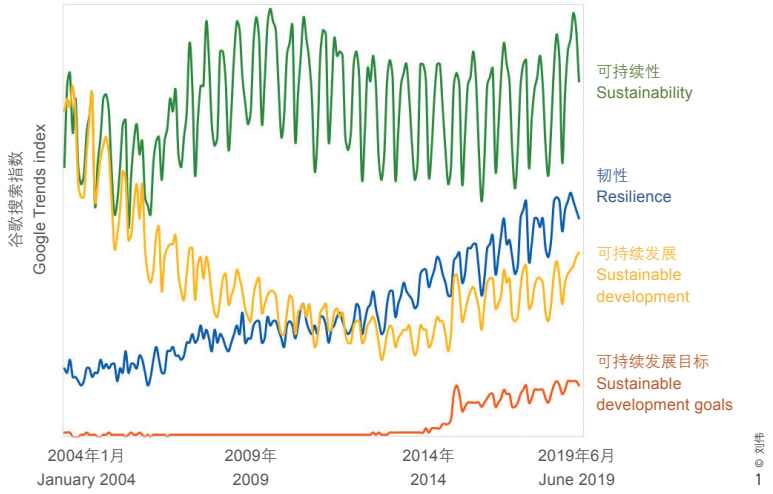
Centuries into the Anthropocene since the Industrial Revolution, this is the best of times, in terms of economic output, science and technology advancement, and life expectancy; this is the worst of times, as of environment pollution, biodiversity loss, as well as poverty and inequity. Humanity, interconnected in complex ways with environment across all scales from local to global, is facing ever-increasing uncertainties, both external and internal[1]~[3].

For the profession of landscape architecture, this may be the best of times. Landscape architects have started to look at bioregional and larger scales and global issues such as climate change, and consider themselves, as the New Landscape Declaration stated, "… versed in both environmental and cultural systems, … uniquely positioned to bring related professions together into new alliances to address complex social and ecological problems, … bring different and often competing interests together so as to give artistic physical form and integrated function to the ideals of equity, sustainability, resilience, and democracy"[4]. Landscape architects have reasons to be optimistic and ambitious as they are recently called up for tasks at macro scales that they rarely took before, from Rebuild by Design in the USA to Sponge Cities planning in China. Many of these are under the name of building landscape resilience to shocks and other stressors, often related to climate change. But, if the "gap between rhetoric and reality" mentioned above cannot be effectively and timely bridged[5], this may turn into the worst of times. Landscape architects need to equip themselves with new theories and methodologies, such as moving away from the dated ecosystem stability idea to the complex adaptive social-ecological system (SES) framework[3].

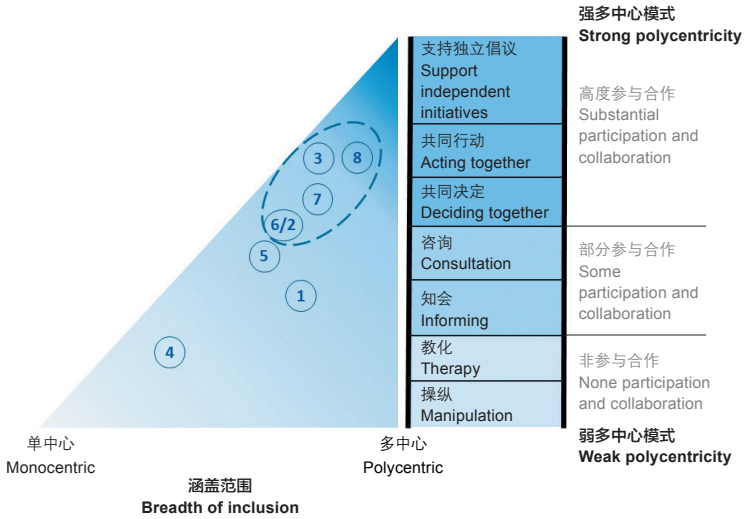
Resilience is arguably the most popular concept of the past decade, with more Google searches than "sustainable development" globally (Fig. 1), likely due to the need to deal with climate change and mega-disasters around the world, such as Hurricane Katrina, Wenchuan Earthquake, Typhoon Haiyan, and Hurricane Sandy. It has quickly emerged as a main objective for landscape planning, design, and management. Landscapes can be conceptualized as SESs that intertwine human with the natural and built environments and meet a range of needs of society and individuals, including the provision of essential, and often public and common, goods and services. Then, landscape resilience is the capacities of a landscape, as a SES, to withstand, cope with, and adapt to changes and to transform when necessary, hence to maintain its functioning and provision of goods and services for human well-being. It is largely an emergent property of complex landscape governance processes — organization and self-organization of human individual and / or group agents in formal and informal institutions. As we march into a more complicated, quasi world, establishing more adaptive forms of governance is considered key to building landscape resilience[6].

Polycentric governance, a concept that was mainstreamed by the 2009 Noble Prize laureate Elinor Ostrom, is often closely associated with adaptive governance[7]. Many have reviewed the evolution of polycentric governance concept and theories, including Aude Zingraff-Hamed et al. in this issue. However, there is a lack of clear principles for operationalizing polycentricity. Here the difference between polycentric governance arrangement and polycentric governance systems needs to be clarified[7]. In short, the former is used for descriptive-analytical purposes; a governance arrangement is polycentric when its constituent decision-making agencies have de facto autonomy from each other. The latter is normative, and a governance system is considered polycentric only if the independent decision-making agencies show some cohesion in recognizing and addressing potential competition and conflicts[7].

Dave Huitema et al.[8] found that while theoretically polycentric arrangement can contribute to adaptive governance, empirically polycentric arrangements are not always superior to monocentric arrangements under uncertainty, for example, in some emergency cases when quick decisions are needed. Claudia Pahl-Wostl et al.[9] found polycentric governance system to be more adaptive than other forms of governance. Reinette Biggs et al.[10] summarized fundamental ways through which polycentric governance may enhance the resilience of ecosystems, including enhancing learning and experimentation, improving connectivity, modularity,



© 刘伟
1



© 刘伟
2

1. 2004年以来的每月谷歌趋势指数表明：全球对“韧性”一词的关注与日俱增；对“可持续发展”的关注度则持续下降，直至联合国宣布可持续发展目标计划后，这一趋势才出现扭转，“可持续性”的关注度也因此而有所升高。
2. 依照多中心性的两轴——涵盖范围及参与和协作水平——对案例进行落位。虚线椭圆形圈中的案例包含大量的参与和协作，因此更偏向于多中心治理体系，而其他案例则更像是多中心治理模式。

1. Monthly Google Trends index since 2004 showing global interests in the term "resilience" increased steadily, while "sustainable development" continued to decline until the United Nations stated the Sustainable Development Goals programs, which also boosted the search for "sustainability."
2. Mapping cases along two continua of polycentricity: breadth of inclusion and degree of participation and collaboration. Cases in the dashed oval circle are closer to be considered as polycentric governance systems, while the others show more polycentric governance arrangements.

蒂亚·帕尔-沃索等[9]发现多中心治理体系比其他治理形式更具适应性。蕾妮特·比格斯等[10]总结了通过多中心治理提升生态系统韧性的基本方法，包括加强学习和试验，改善连通性、模块化、冗余和反应多样性，加强生态系统和组织机构之间的问责制和一致性，以及实质性参与。

在本期中，我们汇集了来自非洲（案例1：南非开普敦市干旱的经验与教训）、美洲（案例2：美国加利福尼亚州圣莫妮卡山都市山地景观治理、案例3：科罗拉多州25号州际公路廊道保护总体规划），亚洲（案例4：印度尼西亚雅加达市用以缓解洪涝问题的当前政策评估、案例5：中国上海三林楔形生态绿地设计）、澳大利亚（案例6：大墨尔本地区城市林业多中心治理）和欧洲（案例7：奥地利阿尔滕马克特市私有土地滞洪工程补偿机制、案例8：通过“生活实验室”和多中心治理设计德国慕尼黑伊萨河的韧性水景）的8个案例，涵盖了洪水、干旱、污染、城市热岛效应及热浪等一系列景观韧性挑战。这些多样化的案例使我们有机会了解多中心性的差异——包括其涵盖范围和协作水平[10]——如何影响不同情境下的治理结果。

为了进一步厘清协作水平的差异，可以将戴夫·威尔考克斯的[11]参与水平工具与雪莉·R·阿尔斯坦的经典参与梯度模型结合使用。阿尔斯坦强调冲突，而威尔考克斯的参与水平工具则强调以建立协作共识为基本前提，从而在不同主体间建立联系。图2是将这一新型工具应用于本期中的各个案例的一次尝试。我们综合文章中的信息，将每个案例进行落位。这些案例无论是在涵盖范围还是在参与/协作水平上都差异巨大，这一点体现在每个案例的治理和韧性绩效上。例如，科罗拉多州25号州际公路廊道保护总体规划成功阻止了城市扩张，维持了重要的景观文化服务。利益相关方之间“前所未有的合作”和创新性多中心筹资机制在其中发挥了重要作用。而在长达32年的伊萨河参与性规划过程中，各种机构和当地利益相关方针对河流恢复和洪水风险管理，共同设计了基于自然的解决方案。虽然许多利益相关方都加入到了与开普敦干旱事件的斗争之中，但合作和沟通的不足最终导致了一场水资源危机。在雅加达，洪水问题的复杂性需要更加综合的水景政策，而不是简单的标准化设计，同时也需要更广泛的治理主体的参与。有必要指出的是，这种落位的目的并非准确定义每个案例的涵盖范围和协作程度，而是旨在在各案例间做出比较和借鉴，且着重关注随着治理方式的演变，景观SES发生了哪些变化。

从这些案例中我们可以发现，在景观研究和实践中引入“多中心性”“韧性”等复杂概念时需要多元的方法论，社会科学方法以及系统性的思考和分析更是必不可少。例如，赞格拉夫-哈梅德等论证了“生活实验室”作为一种创新性利益相关方协商及参与方法与多中心途径具有明显的共同之处。黄志隆等利用系统动力学模型成功剖析了造成雅加达水患频发的众多复杂因素之间的关系。卡米罗·奥多内兹应用扎根理论，从政府这一关键性利益相关者的角度出发，基于现实情况下治理的运作方式来深入理解多中心治理。这些非常规的方法也需要以创新模式引入景观设计教学方法之中。

引入多中心性以提升景观韧性对于设计创新和政策转型都至关重要。在本期中，张振威还详细阐释了中国的生态文明建设为推进景观治理提供了有利的制度环境。最近，中共十九大呼吁“打造共建共享共治的社会治理格局”。这一重要进程需要景观设计师们更积极的参与和合作！

redundancy, and response diversity, and increasing accountability and congruence between ecosystems and institutions, as well as substantial participation.

In this issue, we brought together eight cases from Africa (Case 1: Lessons and experience from the drought of Cape Town, South Africa), America (Case 2: Governance for mountain landscapes in metropolitan areas of the Santa Monica Mountains, California, and Case 3: Interstate 25 Conservation Corridor master plan, Colorado, the USA), Asia (Case 4: Evaluation of the current policy response to urban flooding in Jakarta, Indonesia, and Case 5: Shanghai Sanlin Valley Park, China), Australia (Case 6: Polycentric governance of urban forest in Greater Melbourne), and Europe (Case 7: Compensating flood retention on private land in Altenmarkt, Austria, and Case 8: Using a Living Lab and polycentric governance to design a resilient waterscape of the Isar River in Munich, Germany), covering a range of landscape resilience challenges such as flood, drought, pollution, urban heat island effect, and heatwave. Such a diversity of cases offers us an opportunity to look at how variation in polycentricity — both its breadth of inclusion and collaborative degree[10] — affects governance outcomes in different contexts.

To be more explicit on the continuum of collaborative degree, Dave Wilcox's[11] level of participation tool was used together with Sherry R. Arnstein's classic participation ladder. Arnstein's theory emphasizes conflicts, while Wilcox's level of participation tool emphasizes collaborative consensus built as a fundamental basis for the relationship among different entities. Figure 2 is a first attempt in applying this new tool to the diverse cases in this issue. We position each case across the space based on a synthesis of information from the articles. The cases vary significantly in both inclusion and participatory / collaborative levels, which together corroborate well with observed governance and resilience performance. For example, efforts in the Colorado case successfully stopped urban sprawl and maintained important cultural services of landscapes. The "unprecedented cooperation" among multi-stakeholders and the innovative polycentric funding mechanism played a critical role here. In the 32-year participatory process of the Isar case, diverse institutions and local stakeholders co-designed nature-based solutions in riverine restoration and flood risk management. While many stakeholders were involved in battling against drought in the city of Cape Town, lack of collaboration and communication during the event led it to a water crisis. In Jakarta, the complexity of the flood problem demands a much more holistic waterscape policy, instead of the simplistic Normalisasi policy, as well as a broader participation of diverse actors. It should be noted that the purpose of such a practice is not to find exactly at which point each case should be positioned; It is more for comparison and learning across cases as well as tracking changes in landscape SESs with specific attention to the evolution of governance.

Operationalizing complex concepts such as polycentricity and resilience in landscape research and practice requires methodological pluralism, and especially needs social science methods and systematic thinking and analyses, which is well reflected by the cases here. For instance, Zingraff-Hamed et al. demonstrated a significant overlap between the Living Lab as an innovative stakeholder deliberation and participation methodology and polycentric approach. Edwin Setiadi Sugeng et al. successfully disentangled complex interrelationships of many factors that led to the water vulnerability of the city of Jakarta using system dynamics modeling. Camilo Ordóñez applied Grounded Theory to go deep into an understanding of polycentric governance from the perspective of a key stakeholder — government, and grounded the insights gained on how governance actually operates in reality. These unconventional methodologies need to be innovatively integrated into Landscape Architecture pedagogy.

Operationalizing polycentricity for landscape resilience is highly needed for not only design innovation, but also the necesary policy transformation for society. Last but not least, Zhang Zhenwei in this issue elaborated that Ecological Civilization construction in China provides a favorable institutional environment for advancing landscape governance. More recently the Nineteen National Congress of the Communist Party of China called for "establishing a social governance model based on collaboration, participation, and common interests." More participation and collaboration from landscape architects is needed in this important process!

REFERENCES

[1] Vitousek, P. M., Mooney, H. A., Lubchenco, J., & Melillo, J. (1997). Human domination of Earth's ecosystems. Science, 277(5325), 494-499.

[2] Waters, C. N., Zalasiewicz, J., Summerhayes, C., Barnosky, A. D., Poirier, C., Gałuszka, A., ... Wolfe, A. P. (2016). The Anthropocene is functionally and stratigraphically distinct from the Holocene. Science, 351(6269), aad2622.

[3] Folke, C., Biggs, R., Norström, A. V., Reyers, B., & Rockström, J. (2016). Social-ecological resilience and biosphere-based sustainability science. Ecology and Society, 21(3), 431.

[4] Landscape Architecture Foundation. (2016). The New Landscape Declaration. Retrieved from https://www.lafoundation.org/take-action/new-landscape-declaration

[5] Fleming, B. (2019 April). Design and the Green New Deal. Retrieved from https://placesjournal.org/article/design-and-the-green-new-deal/

[6] Folke, C., Hahn, T., Olsson, P., & Norberg, J. (2005). Adaptive governance of social-ecological systems. Annual Review of Environment and Resources, (30), 441-473.

[7] Marshall, G. R. (2015 January). Polycentricity and adaptive governance. 15th Biennial Global Conference of the International Association for the Study of the Commons, Edmonton, Canada. Retrieved from https://www.researchgate.net/publication/277598119_Polycentricity_and_adaptive_governance

[8] Huitema, D., Mostert, E., Egas, W., Moellenkamp, S., Pahl-Wostl, C., & Yalcin, R. (2009). Adaptive water governance: Assessing the institutional prescriptions of adaptive (co-) management from a governance perspective and defining a research agenda. Ecology and Society, 14(1), 26.

[9] Pahl-Wostl, C., & Knieper, C. (2014). The capacity of water governance to deal with the climate change adaptation challenge: Using fuzzy set Qualitative Comparative Analysis to distinguish between polycentric, fragmented and centralized regimes. Global Environmental Change, (29), 139-154.

[10] Biggs, R., Schlüter, M., & Schoon, M. L. (2015). Principles for building resilience: Sustaining ecosystem services in social-ecological systems. Cambridge: Cambridge University Press.

[11] Wilcox, D. (1994). The guide to effective participation. Brighton: Partnership Books.