

Will the COVID-19 crisis trigger a One Health coming-of-age?



As the COVID-19 pandemic continues across the globe, leaving governments and public health services in shock and disarray, calls have been made for the need to adopt One Health approaches to address the failure to predict and halt the emergence of COVID-19.¹ The novel severe acute respiratory syndrome coronavirus 2 is widely suggested to have originated in Asia from a bat reservoir, possibly also involving other animal bridge species. As such, the focus of One Health on the human–animal–environment interface appears particularly compelling.² We concur, however, we warn that conceptual and institutional ambiguities that preclude the practical implementation and evaluation of One Health remain to be resolved.^{3,4}

One Health was initially adopted by major health agencies more than a decade ago to promote interdisciplinary collaborations among biomedical scholars and practitioners, and then progressively with workers in the environmental and social sciences, with the aim of establishing a more society-wide responsibility for the health of humans and the whole planetary ecosystem. One Health is embedded within the concept of EcoHealth, which further extends the scope to complex human–environment systems.⁵ This broader concept of health in social–ecological systems gained momentum, adopting a transdisciplinary action-research posture, and converged with sustainability sciences. Social–ecological systems uniquely formalised and explicitly defined resilience as a property of complex adaptive systems, the theoretical and practical validity of which is now supported by hundreds of case examples of diverse social–ecological systems.³ However, the word resilience is often used in a health context without a clear reference to this dimension of social–ecological systems, or any other explicit definition. The term resilience is especially confusing in the fields of public and animal health, in which resilience has several different meanings.⁶ Use of the term resilience in an environmental health systems context should be accompanied by a clear specification of whether or not its intended meaning is consistent with the social–ecological systems framework. Overcoming the fundamental ambiguities in the framing of One Health—ie, whether it addresses the resilience of social–ecological systems or the health of humans, animals, and the bio-physical environment in

the context of social–ecological systems—is essential to overcoming a number of challenges to its practical implementation as a transdisciplinary concept.^{3,7}

Without more explicit framing as complex systems, the ambitions of One Health are likely to fail most of the time at the implementation phase due to functional mismatches between the scale of management and the scale of the processes being managed.⁸ Public health and veterinary services are not usually organised or equipped to operate according to how ecosystems are hierarchically organised.⁶ These scale mismatches between the ecological and social changes that drive disease emergence and spread, and the scale at which epidemiological surveillance and effective health and nature management occur, preclude the necessary adaptive governance of linked social–ecological systems.⁸ Similar causal mismatches are also associated with an inadequate response, whereby the proximal responses to sanitary crises (eg, emergency responses to COVID-19) do not address their distal causes, which are often rooted at higher levels within social–ecological systems (eg, environmental and social injustices driving biodiversity overexploitation and extinction).⁹

In the era to follow the emergence of COVID-19, policymakers, funders, and the general public will require that health–environment system risk management goes beyond routine measures. One Health can meet this demand provided its ambiguities are resolved. At a local level, where direct interactions between humans, livestock, wildlife, and other biodiversity components occur, One Health implementation necessitates a transdisciplinary and cross-sectorial collaboration with local communities and stakeholders, to understand and mitigate environmental and epidemiological risks. National agencies in public health, veterinary medicine, and environmental services are typically centralised and organised in siloes, which impedes the integration required to enable efficient and inclusive engagement and collaboration among stakeholders. One Health governance should adopt appropriate participatory processes to include, at a minimum, communities, non-governmental organisations, and other public or private entities for monitoring and management from the bottom up, locally to nationally. At the regional and international levels, One Health as a policy tool

is hindered by the same framing ambiguities, and is structurally imbalanced. The challenges in the human and animal health sectors are legitimately and efficiently represented within the tripartite WHO–World Organisation for Animal Health (OIE)–Food and Agriculture Organization (FAO) coalition, which are the UN agencies that currently lead One Health. But wildlife and the environment are neglected,¹⁰ and the framing of One Health as a complex human–environment system is absent. We suggest that the UN Environment Program (UNEP), which hosts the secretariats of several international environmental conventions, such as the Convention on Biological Diversity, should be included in the One Health coalition with WHO, OIE, and FAO. Through its mandate on international environmental governance, UNEP could facilitate the much-needed articulation of health challenges with the Sustainable Development Goals,³ anchoring the One Health approach within a wider initiative to achieve a healthy planet for all.

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- 1 Amuasi JH, Walzer C, Heymann D, et al. Calling for a COVID-19 One Health Research Coalition. *Lancet* 2020; **395**: 1543–44.
- 2 Kock RA, Karesh WB, Veas F, et al. 2019-nCoV in context: lessons learned? *Lancet Planet Health* 2020; **4**: e87–88.
- 3 Wilcox BA, Aguirre AA, De Paula N, Siriaroonrat B, Echaubard P. Operationalizing One Health employing socio-ecological systems theory: lessons from the Greater Mekong Sub-region. *Front Public Health* 2019; **7**: 85.
- 4 Assmuth T, Chen X, Degeling C, et al. Integrative concepts and practices of health in transdisciplinary social ecology. *Socio Ecol Pract Res* 2020; **2**: 71–90.
- 5 Zinsstag J, Waltner-Toews D, Tanner M. Theoretical issues of One Health. In: Zinsstag J, Schelling E, Waltner-Toews D, Whittaker M, Tanner M, eds. *One Health: the theory and practice of integrated health approaches*. Wallingford: Centre for Agriculture and Bioscience International, 2015: 16–25.
- 6 Morand S, Lajaunie C. Landscape dynamics and the control of infectious diseases: the question of integrating health into coviability. In: Barrière O, Behnassi M, David G, et al. *Coviability of social and ecological systems: reconnecting mankind to the biosphere in an era of global change*. New York, NY: Springer, 2019: 61–76.
- 7 Antoine-Moussiaux N, Janssens de Bisthoven L, Leyens S, et al. The good, the bad and the ugly: framing debates on nature in a One Health community. *Sustain Sci* 2019; **14**: 1729–38.
- 8 Cumming GS, Cumming DHM, Redman C. Scale mismatches in social-ecological systems: causes, consequences and solutions. *Ecol Soc* 2006; **11**: 14–34.
- 9 Wallace RG, Bergmann L, Kock R, et al. The dawn of structural One Health: a new science tracking disease emergence along circuits of capital. *Soc Sci Med* 2015; **129**: 68–77.
- 10 Essack SY. Environment: the neglected component of the One Health triad. *Lancet Planet Health* 2018; **2**: e238–39.