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Short communication

Post-2015 Sustainable Development Goals still neglecting their environmental roots in the Anthropocene[☆]

Andrea J. Reid^{a,*}, Jill L. Brooks^a, Lana Dolgova^b, Bruce Laurich^b, Brittany G. Sullivan^a,
Petra Szekeres^a, Sylvia L.R. Wood^c, Joseph R. Bennett^{a,d}, Steven J. Cooke^{a,d}

^a Department of Biology, Carleton University, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada^b National Wildlife Research Centre, Carleton University, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada^c The Earth Institute, Columbia University, 2910 Broadway, New York, NY 10025, USA^d Institute of Environmental Sciences, Carleton University, 1125 Colonel By Drive, Ottawa, ON K1S 5B6, Canada

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ABSTRACT

The Sustainable Development Goals (SDGs; promulgated in 2015), officially known as “Transforming our world: the 2030 Agenda for Sustainable Development”, are an intergovernmental set of 17 goals and 169 constituent targets that succeed the Millennium Development Goals (MDGs; 2000–2015). Despite a clear mandate to integrate social, economic and environmental objectives in the SDGs, ecosystem health remains underrepresented in this latest iteration of the United Nation’s global development agenda. We submit that maintaining ecosystem health (Goal 14: *life below water* and Goal 15: *life on land*) is a necessary precondition to achieving the 2030 Agenda for Sustainable Development. Here, we present a reconceptualized SDG framework akin to a tree that places Healthy Ecosystems as the roots for five branches of development (Clean Energy, Water Security, Food Security, Lives and Livelihoods, Governing for Sustainability). As universal examples, we put forward the vital role of life below *fresh* water for ending poverty by 2030 (Goal 1: *no poverty*) and describe how children’s environmental health is the foundation for the major health priorities of reproductive, maternal and child health (Goal 3: *good health and well-being*). This framework provides insight and evidence for policymakers and the public to be cognizant that prioritizing ecosystem health goals can serve human development objectives which we deem as key to realizing the unified plan of action for people, planet and prosperity.

1. Introduction

Despite a clear mandate to integrate social, economic and environmental objectives in the post-2015 Sustainable Development Goals (SDGs), ecosystem health remains underrepresented in this latest iteration of the United Nation’s (UN) global development agenda (Wood and DeClerck, 2015). Successors to the eight Millennium Development Goals (MDGs) for 2000–2015, the 17 SDGs and their 169 constituent targets include only two goals and 29 targets that explicitly address environmental concerns (see Table 1). Put forward by the UN Open Working Group and adopted by the UN General Assembly (2015), the SDGs are being operationalized over the next 15 years not by their creators but by those who study and enact social, economic and environmental development. As early-career environmental scientists, we (the authors) and other early-career researchers will form one of the

main cohorts, along with policy people and entrepreneurs, tasked with achieving the global goals by 2030 and beyond. We submit that maintaining healthy ecosystems is a necessary precondition to achieving the 2030 Agenda for Sustainable Development and ensuring post-2030 sustainability. Here, we argue that ecosystem health is the foundation for social and economic development activities and present two universal examples where human welfare hinges on environmental health. Our hope is that this document will guide policymakers and practitioners to recognize that ecosystem health maintenance is a means of enabling social and economic well-being.

2. Sustainability is rooted in the environment

The three pillars of sustainable development (society, economy, environment) are inextricably linked, with the connections between

[☆] Second through sixth authors contributed equally to this work and are listed alphabetically.

* Corresponding author.

E-mail addresses: AndreaJReid@mail.carleton.ca (A.J. Reid), JillBrooks@mail.carleton.ca (J.L. Brooks), LanaDolgova@mail.carleton.ca (L. Dolgova), BruceLaurich@mail.carleton.ca (B. Laurich), BrittanySullivan@mail.carleton.ca (B.G. Sullivan), PetraSzekeres@mail.carleton.ca (P. Szekeres), SylvieWood@gmail.com (S.L.R. Wood), Joseph.Bennett@carleton.ca (J.R. Bennett), Steven.Cooke@carleton.ca (S.J. Cooke).

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Table 1

The Sustainable Development Goals' (SDG) constituent targets (n = 169) agglomerated into six focal areas following Griggs et al. (2013). SDG targets categorized as either being 'explicitly connected' (n = 29) or 'plausibly or not connected' (n = 140) with promoting Healthy Ecosystems. Targets are deemed 'explicitly connected' when they unambiguously prescribe protection and sustainable use of ecosystems and their services (e.g., Target 6.6 "By 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes") and 'plausibly or not connected' when such a link is not established (e.g., Target 6.1 "By 2030, achieve universal and equitable access to safe and affordable drinking water for all").

Goal	Focal area	Sustainable Development Goals' (SDGs) constituent targets and their connections with ecosystem health Connected to Healthy Ecosystems	
		Explicitly	Plausibly or not
Goal 1: <i>no poverty</i>	Lives and Livelihoods	1.5	1.1, 1.2, 1.3, 1.4, 1.a, 1.b
Goal 2: <i>zero hunger</i>	Food Security	2.4, 2.5	2.1, 2.2, 2.3, 2.5, 2.a, 2.b, 2.c
Goal 3: <i>good health and well being</i>	Lives and Livelihoods		3.1, 3.2, 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, 3.9, 3.a, 3.b, 3.c, 3.d
Goal 4: <i>quality education</i>	Lives and Livelihoods		4.1, 4.2, 4.3, 4.4, 4.5, 4.6, 4.7, 4.a, 4.b, 4.c
Goal 5: <i>gender equality</i>	Lives and Livelihoods		5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.a, 5.b, 5.c
Goal 6: <i>clean water and sanitation</i>	Water Security	6.3, 6.5, 6.6	6.1, 6.2, 6.4, 6.a, 6.b
Goal 7: <i>affordable and clean energy</i>	Clean Energy		7.1, 7.2, 7.3, 7.a, 7.b
Goal 8: <i>decent work and economic growth</i>	Lives and Livelihoods	8.4	8.1, 8.2, 8.3, 8.5, 8.6, 8.7, 8.8, 8.9, 8.10, 8.a, 8.b
Goal 9: <i>industry, innovation and infrastructure</i>	Clean Energy		9.1, 9.2, 9.3, 9.4, 9.5, 9.a, 9.b, 9.c
Goal 10: <i>reduced inequalities</i>	Lives and Livelihoods		10.1, 10.2, 10.3, 10.4, 10.5, 10.6, 10.7, 10.a, 10.b, 10.c
Goal 11: <i>sustainable cities and communities</i>	Lives and Livelihoods	11.6, 11.a	11.1, 11.2, 11.3, 11.4, 11.5, 11.7, 11.b, 11.c
Goal 12: <i>responsible consumption and production</i>		12.2, 12.4, 12.5, 12.8, 12.c	12.1, 12.3, 12.6, 12.7, 12.a, 12.b
Goal 13: <i>climate action</i>	Clean Energy		13.1, 13.2, 13.3, 13.a, 13.b
Goal 14: <i>life below water</i>	Healthy Ecosystems	14.1, 14.2, 14.4, 14.5, 14.a, 14.c	14.3, 14.6, 14.7, 14.b
Goal 15: <i>life on land</i>	Healthy Ecosystems	15.1, 15.2, 15.3, 15.4, 15.5, 15.8, 15.9, 15.a, 15.b	15.6, 15.7, 15.c
Goal 16: <i>peace, justice and strong institutions</i>	Governing for Sustainability		16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7, 16.8, 16.9, 16.10, 16.a, 16.b
Goal 17: <i>partnerships for the goals</i>	Governing for Sustainability		17.1, 17.2, 17.3, 17.4, 17.5, 17.6, 17.7, 17.8, 17.9, 17.10, 17.11, 17.12, 17.13, 17.14, 17.15, 17.16, 17.17, 17.18, 17.19
TOTAL:		29	140

these spheres long recognized (2002 World Summit on Sustainable Development). These connections, however, are not fully developed, nor are they capitalized upon, in the current SDG framework.

The linkages and feedbacks between social, economic and environmental systems are many and varied. Humans rely on services from ecosystems, such as clean air, water and food, for both wealth and security. Meanwhile, ecosystems are transformed by human actions to appropriate these resources, such as deforestation for agricultural or urban expansion, which can leave ecosystems unable to continue to support those crucial services now and into the future (Folke et al., 2002). Indeed, human transformation of natural systems is so profound (Vitousek et al., 1997) that many are referring to this period as the Anthropocene (Crutzen, 2006). Recognition that human development and associated activities are producing environmental consequences on an unprecedented scale and that their effects can undermine development gains in the long-term points to a need for a fundamental reorganization of the way in which the SDGs are currently being framed and discussed.

Despite recommendations following the MDGs to recognize that the global goals are connected and interdependent (Lubchenco et al., 2015), the current SDG Knowledge Platform (see [https://](https://sustainabledevelopment.un.org/sdgs)

sustainabledevelopment.un.org/sdgs) and the supporting UN documentation continue to present the global goals as a linear, enumerated list. This sets the stage for addressing the goals in isolation and in a sequence that prioritizes social and economic goals (Goals 1–13) ahead of environmental objectives (Goals 14–15). The interactions between the SDGs have recently been described and mapped by Nilsson (and colleagues 2016; 2017), illustrating that a more integrated view of the global goals could allow for progress towards one goal to be understood in terms of its cascading impacts on other related goals. Identifying, understanding and quantifying each of the synergistic and antagonistic linkages between the environment and human development presents one of the formidable challenges that those operationalizing the SDGs now face.

We assert here that an important starting point for this undertaking is a reconceptualization of the current SDG framework, whereby the environmental goals, Goal 14 (*life below water*) and Goal 15 (*life on land*), are recognized as a necessary precondition for achieving sustainable development. While a comprehensive list of goals and targets (see Table 1 and SDG Knowledge Platform) has helped the SDGs become more precise and quantifiable than their MDG predecessors (Nilsson, 2017), the many new global goals can be agglomerated into

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