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The climate-biodiversity-health nexus: a framework for integrated community sustainability planning in the Anthropocene

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Integrated approaches to planning and policy are important for making progress toward sustainability. A variety of frameworks have been developed for facilitating such approaches to planning and policy, such as the water-energy-food (WEF) nexus. However, the WEF nexus has been criticized for a lack of clarity in how to apply the framework, whereas a goals-oriented framework potentially could be more easily applied and operationalized. This paper proposes such a framework, referred to here as the climate-biodiversity-health (CBH) nexus. The paper details the features of the CBH nexus framework, the interactions among its domains, and its potential applications. The CBH nexus consists of three domains (i.e., climate action, biodiversity conservation, and community health) and six subdomains (i.e., climate change mitigation, climate change adaptation, habitat protection and regeneration, wildlife health and welfare, physical health, and mental health). The framework can be applied in practice to develop checklists/toolkits for guiding new development and as a basis for creating community indicator systems. It can also be applied in research to identify gaps in planning and policy documents and as a lens for participatory modeling exercises. Continued experimentation with, and improvement of, the CBH framework will reveal its most useful applications, thereby opening new opportunities for communities to effectively develop and implement integrated sustainability plans and policies.

KEYWORDS

climate change, biodiversity, health, nexus framework, integrated planning, sustainable communities/cities

1. Introduction

Integrated approaches to planning and policy that incorporate relationships among ecological, social, economic, political, geographical, and cultural factors are important for making progress toward sustainability (Kemp et al., 2005; Ling et al., 2009). Such approaches can facilitate the implementation of strategies with a recognition of their linkages to broader goals for humans and the environment (Newell and Dale, 2021; Newell et al., 2022). The popularized "three-pillar model" of sustainability and sustainable development encourages this type of integration, as it calls for the reconciliation of social, economic, and environmental imperatives (Dale, 2001; Newman and Jennings, 2008; Rydin, 2010). Accordingly, scholars and researchers have argued for integrated approaches in variety of different planning and policy areas and contexts, including community development (Newell et al., 2020), climate action (Shaw et al., 2014), coastal management (Sorensen, 1997), food systems planning (Blay-Palmer et al., 2013), watershed management (Wang et al., 2016), and natural resource management (Carter et al., 2005).

The concept of sustainability and its three-pillar model are purposely vague with respect to operationalization and implementation, as there is no "one-size-fits-all" approach to sustainable development (Robinson, 2004). A variety of other frameworks have been developed for facilitating integrated sustainability planning, policy, and management in specific environmental and geographical contexts, such as integrated watershed management planning (Cuvelier and Greenfield, 2017), integrated coastal management (Sorensen, 1997), and integrated resource management (Carter et al., 2005). For local level contexts and urban settings, scholars have proposed the water-energy-food (WEF) nexus, arguing that it can serve as a useful framework for integrated planning and making progress toward community sustainability (Hoff, 2011; Galderisi, 2017). The purpose of WEF nexus is to simulate thinking about the key connections among the critical planning and policy areas identified in the framework to enable the implementation of strategies with a recognition of their co-benefits and trade-offs across WEF systems (Sperling and Berke, 2017).

Although the WEF nexus has potential for stimulating integrated thinking, the framework has also been criticized for reasons such as a lack of clarity in how to apply it and how it frames sustainability in terms of resource scarcity (Purwanto et al., 2021). Some argue that it is the term "nexus" itself is ambiguous, creating issues around how to operationalize the framework (Cairns and Krzywoszynska, 2016); whereas, others argue that what is needed is a move from "nexus thinking" to "nexus doing" (Simpson and Jewitt, 2019). Building on the latter argument, a potential issue with the operationalization of the WEF nexus is that it is vague in what is attempting to be achieved through the application of the framework. For example, the types of goals that exist within the food planning and policy domain are plentiful and highly varied, with different food systems strategies relating to and supporting a wide range of community objectives such as economic development, food security, tourism, and community health (Issac et al., 2022).

An approach to developing a nexus framework that is potentially more straightforward to put into practice is to focus on clear sustainability objectives, rather than planning and policy domains. Such a "goals-oriented" nexus framework would center on the issues that are integral to sustainability. In the current Anthropocene epoch marked by human-induced changes to global environmental systems, climate change and biodiversity loss are identified as among the most significant sustainability issues threatening humanity and the planet (Steffen et al., 2015a; Berkes, 2017). Recent reports from the Intergovernmental Panel on Climate Change (2022), the Intergovernmental Science-Policy Platform on Biodiversity Ecosystem Services (2019), and World Wide Fund for Nature (2022) have confirmed the severity of these issues and their increasing consequences for human wellbeing. Additionally, Steffen et al. (2015b) identify how climate change and biodiversity loss are highly connected to other major sustainability challenges, positioning these issues as useful foci for the systems thinking required in integrated policy, planning, and management. Many scholars argue that it is essential for communities to engage in climate action and biodiversity conservation in order to build socio-ecological resilience and make progress toward sustainability (e.g., Young, 2010; Collier et al., 2013; Davis et al., 2016); accordingly, climate and biodiversity are valuable components in a goals-oriented nexus framework.

Another required component of the goals-oriented nexus framework is one that directly captures the "human" aspects of sustainability. This follows the thinking of Caputo et al. (2021), who argued for such an inclusion in the WEF framework by expanding it to the water-energy-food-people nexus. However, the term "people" is not a nexus dimension or component that fits within a goals-oriented context; that is, a goals-oriented framework would instead focus on people-related goals. Such goals are often captured using fairly ambiguous terms, such as "human wellbeing" and "quality of life" (Dempsey et al., 2011; Murphy, 2012; De Haan et al., 2014), but also can be more strategically framed in terms of health, both mental and physical. Strategies that support community health exhibit a multitude of relationships with social, economic, and environmental sustainability, as indicated in the World Health Organization (1997) City Planning for Health and Sustainable Development report that expresses how community health requires a balance of "[c]ommunity conviviality, environmental viability and economic adequacy" (p. 42). Therefore, similar to climate action and biodiversity conservation, community health serves a useful goals-oriented component of a framework for facilitating the systems thinking that is required for integrated planning and policy.

This paper presents the climate-biodiversity-health (CBH) nexus, arguing that it is a useful framework for supporting integrated community sustainability planning and policy in the context of the critical environmental and social challenges of the modern day. The paper begins with a description of the CBH nexus framework and the intersections between its different domains. This discussion is supported with references to other frameworks, concepts, and studies that identify integration between the CBH domains to demonstrate how the proposed framework is not entirely novel in that it builds on previous thinking and research. The paper then illustrates how the framework can be applied to research and practice in sustainable community development, and it concludes with a recommendation that researchers and practitioners experiment and refine the framework to identify its different (and best) applications.

2. The climate-biodiversity-health nexus

The CBH nexus is not an entirely novel framework in that it builds on previous nexus work. The WEF nexus has been expanded to include other domains and broaden its applicability (e.g., Caputo et al., 2021), and such expansion has included CBH components, such as in work that centers on the water-food-energy-climate (Beck and Walker, 2013), water-energy-food-ecosystems (Nika et al., 2022), water-energy-food-health (Slorach et al., 2020), and water-energy-food-health-climate (Jaafar, 2021), water-energy-food-health-ecosystems (Mohtar et al., 2022) nexuses. In some ways, the CBH nexus can be regarded as a reorientation of current nexus frameworks, where climate action, biodiversity conservation, and community health serve as the base domains instead of food, water, and energy.

Recent reports have provided strong justification for reorienting nexus frameworks to the CBH domains. The Intergovernmental Panel on Climate Change's (2022) sixth assessment of climate change impacts, adaptation, and vulnerability explicitly draws linkages among climate change, ecosystems integrity, and human health and wellbeing. Similarly, World Wide Fund for Nature's (2022) recent Living Planet Report features climate change as an issue that is inextricably linked to the global biodiversity crisis, as well as expresses how addressing these interconnected crises is critical for human health and wellbeing. Additionally, a report produced from a joint workshop between IPCC and IPBES that explored relationships among climate change and biodiversity presented a "climate-biodiversity-society" nexus (Pörtner et al., 2021), referring to it as a systems framing for identifying co-benefits and trade-offs of different policies and strategies with respect to these key sustainability domains. The CBH nexus is similar to the climate-biodiversity-society nexus, with the exception that it includes "health" as the third domain instead of "society."

As noted, one of the main issues of the nexus frameworks involves challenges around operationalization due vagueness and ambiguity in the frameworks (Cairns and Krzywoszynska, 2016; Purwanto et al., 2021). To address this issue, this paper proposes a CBH framework with an increased level of detail and resolution through the addition of subdomains. Newell et al. (2022) have made progress in this area through a study that developed an integrated climate-biodiversity analytical framework, which disaggregates climate action and biodiversity conservation into different areas of actions and objectives. Following common convention (e.g., Klein et al., 2007), the authors disaggregate climate action into (1) mitigating climate change through reducing and capturing greenhouse gas emissions, and (2) adapting to a changing climate and its effects. They disaggregate biodiversity conservation into (1) efforts toward habitat protection and conservation and (2) work toward promoting the health and wellbeing of wildlife, with the former capturing the profound impact that habitat loss has on biodiversity (Intergovernmental Science-Policy Platform on Biodiversity Ecosystem Services, 2019; World Wide Fund for Nature, 2022) and the latter referring to species- and species-interactions-focused efforts, such as reducing wildlife traffic mortality (Lister et al., 2015), managing overharvesting (World Wide Fund for Nature, 2022), and improving plant-pollinator relationships (Scherr and McNeely, 2008).

The additional dimension of health is disaggregated here into physical and mental health subdomains. Physical health objectives relate to strategies that promote healthy communities, such as increasing local walkability to improve the health of community members via active transportation (Frank et al., 2006; Barton, 2009) and reducing harmful pollutants such as particulate matter emissions which contribute to respiratory issues (Nemet et al., 2010). Mental health objectives are associated with the complex relationships people form with places, communities, and their sense of self and identity; thus, they relate to a variety of factors such as place attachment (Skrede and Andersen, 2022), access to nature and local beauty (Jennings et al., 2016), social networks and capital (Jennings and Bamkole, 2019), and livelihoods (Vins et al., 2015). It is worth noting that the latter example demonstrates how the health domain can bring economic considerations into applications of the CBH nexus, as it refers to how sustainable livelihoods and meaningful employment are important for mental health and wellbeing.

The CBH framework, complete with its three domains and six subdomains, is presented in Figure 1. Each of the subdomains interact with one another, including within and across the CBH domains. The interactions between subdomains are well-documented, with scholars and researchers arguing for the integration of climate mitigation and adaptation (e.g., Shaw et al., 2014), the protection and conservation of habitat to support the protection of species (e.g., Adamo et al., 2022), and the recognition of the interconnectedness of mental and physical health (e.g., Weiss et al., 2009). This paper does not focus on these intradomain relationships; instead, the interdomain relationships are discussed below to illustrate how the CBH nexus can facilitate integrated, systems-based thinking about co-benefits and trade-offs.

2.1. Climate-biodiversity

The relationships among climate change and biodiversity issues and objectives have been explored by numerous researchers (Raymond et al., 2017; Spencer et al., 2017; Reynolds et al., 2019), and the interconnectedness between these two critical sustainability issues has been articulated in high-profile works, such as those by the Intergovernmental Science-Policy Platform on Biodiversity Ecosystem Services (2019), Intergovernmental Panel on Climate Change (2022), and World Wide Fund for Nature (2022). Newell et al. (2022) have already made progress on the development of the CB aspect of the CBH nexus through their development of an analytical framework for identifying co-benefits and trade-offs among climate and biodiversity plans, policies, and strategies.

Often, strategies that deliberately target co-benefits for climate and biodiversity objectives are referred to nature-based solutions, involving the use of greenspace and green infrastructure to achieve objectives (Raymond et al., 2017; Smith et al., 2019). Examples of nature-based solutions for climate mitigation and adaptation include the protection of mangrove environments, which (in addition to providing habitat) can sequester carbon and provide coastal storm surge and flood protection (Spencer et al., 2017). Other nature-based solutions include the implementation of green infrastructure both to improve stormwater management (i.e., climate change adaptation) and to reduce pollutants and sediment deposits in aquatic habitats (i.e., biodiversity conservation; Choi et al., 2021; Newell et al., 2022).

Trade-offs between climate and biodiversity objectives also have been observed, such as those related to energy development and transitions to green energy. Such trade-offs include impacts to bats and avian species from wind turbines (Saidur et al., 2011; Ürge-Vorsatz et al., 2014), the replacement of high-quality habitat with monoculture plantations for biomass energy (Onaindia et al., 2013), and increased habitat fragmentation from new road networks required to develop and service distributed energy systems (Newell et al., 2022). Trade-offs also can be seen in other planning and policy areas, such as when the widespread implementation of urban vegetation for stormwater and temperature regulation (i.e., climate adaptation) also exerts stress on local ecosystems due to

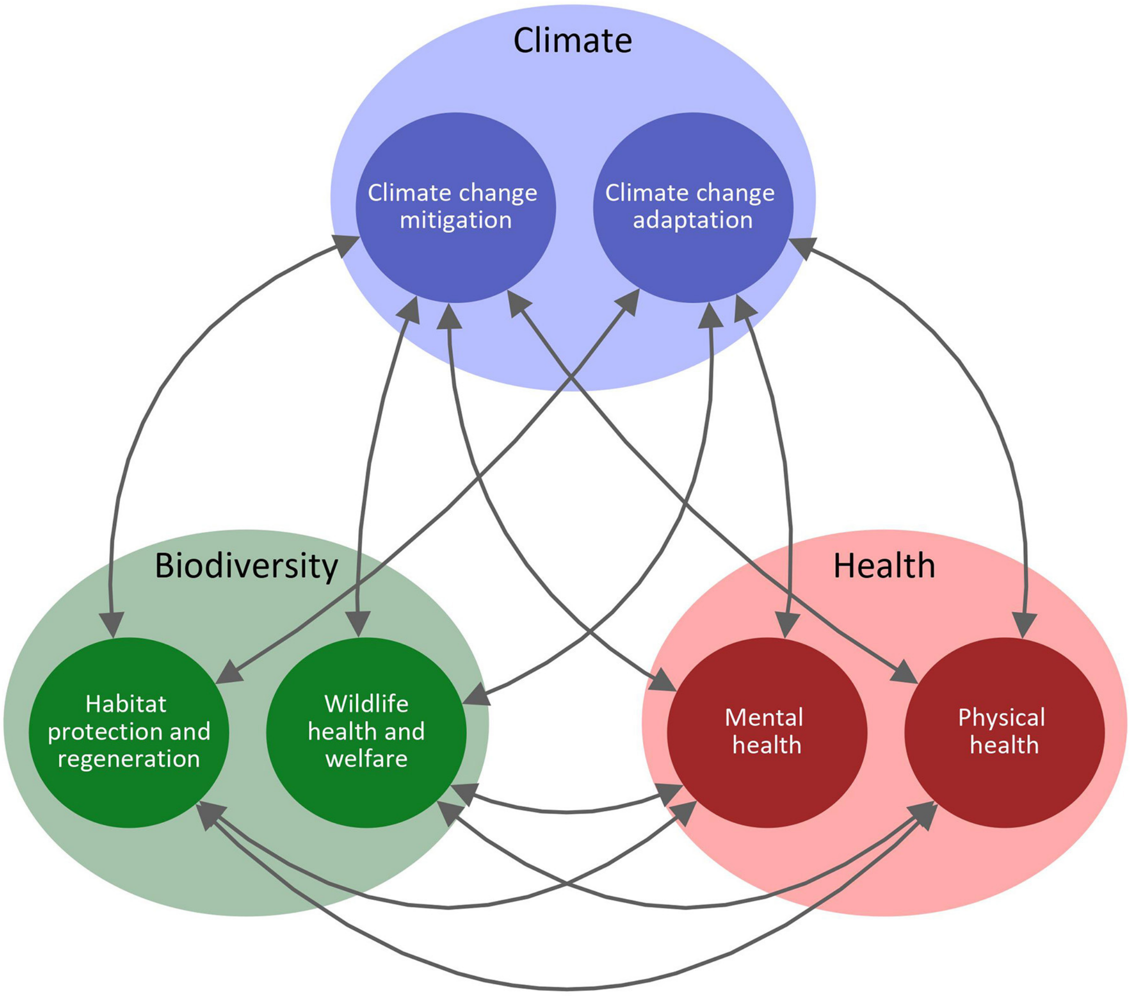

FIGURE 1
The policy and planning domains and subdomains/objectives of the climate-biodiversity-health nexus framework.

it consisting of exotic, invasive species (Colléony and Shwartz, 2019; Choi et al., 2021). Generally speaking, climate action and biodiversity have described as mutually supportive with many co-benefits (e.g., Pörtner et al., 2021); however, it is important to develop and employ frameworks such as the CBH nexus that also reveal the ways in which strategies are not purely "win-win" solutions (Newell et al., 2018).

2.2. Climate-health

Similar to biodiversity, climate change and action share a multitude of relationships with human health. Physical health benefits from climate action can involve adaptation strategies that directly address climate impacts, such as the implementation of green infrastructure to create cooler local temperatures and reduce heat stress (Choi et al., 2021). Health objectives are also achieved through co-benefits with climate change mitigation, such as strategies directed toward the reduction of fossil fuel usage to decrease both greenhouse gas and particulate matter emissions (Nemet et al., 2010). Climate action also produces co-benefits for mental health, as seen with how green infrastructure and parks contribute to mental health through improving local aesthetics and access to nature (Sturm and Cohen, 2014; Jennings et al., 2016). Other mental health benefits can be received by avoiding/reducing the psychological stress that occurs from natural disasters, such as improving flood management and infrastructure to reduce the impacts (and related stress) from flooding (Houghton and Castillo-Salgado, 2017).

Health trade-offs from climate action can occur in multiple ways and are dependent on how certain strategies are implemented. With reference to the urban vegetation example discussed above, certain tree species can contribute to adverse community health effects due to local production of allergens (Dales et al., 2008; Choi et al., 2021). As an example related to mental health, densifying a city can serve as a climate action strategy due to increases in transportation and building energy efficiencies; however, it can also lead to taller buildings that impact views, the character of a community, and people's sense of place (Newell et al., 2018; Skrede and Andersen, 2022). In both examples, the general strategies of urban vegetation and mixed-use density did not necessary inherently carry health trade-offs; rather, these trade-offs emerge when considering the specific approach to the strategies, such as what species should be used for urban forest strategies (e.g., Eisenman et al., 2019) and what degree of densification should be implemented (e.g., Newell et al., 2021).

2.3. Biodiversity-health

The relationships between biodiversity and health have been captured through multiple frameworks and concepts. For example, the One Health framework provides a holistic approach for understanding the relationships and dependencies among human, animal (e.g., domesticated, livestock), and ecological/environmental (including wildlife) health (Essack, 2018); it is a framing that is often employed with respect to agriculture and infectious diseases (e.g., Destoumieux-Garzón et al., 2018). As another example, the ecosystems services framework, introduced by the Millennium Ecosystem Services (2005), categorizes the benefits that healthy, functioning ecosystems provide humans and the biosphere into provisioning, regulating, supporting, and cultural services, and numerous subsequent works have confirmed how ecosystems services are vital for human health and wellbeing (e.g., Intergovernmental Science-Policy Platform on Biodiversity Ecosystem Services, 2019; Intergovernmental Panel on Climate Change, 2022; World Wide Fund for Nature, 2022). The relationships between health and biodiversity also have been described through concepts such as "green prescriptions" and "nature-based health interventions" (Shanahan et al., 2019). Using a local planning and strategies perspective, Robinson and Breed (2019) describe how these prescriptions/interventions can be performed on community scales (i.e., beyond just the individual) through the implementation of greenspace and green infrastructure.

As illustrated above, the health of humans and the environment are tightly interconnected; thus, trade-offs between these two domains are perhaps not immediately obvious. However, trade-offs do exist, particularly with respect to land-use conflicts. For instance, trade-offs can occur when goals for protecting habitat and ecological integrity are compromised by allowing human activity and recreation in these areas (Horne et al., 2005), with recreational opportunities being important for physical and mental health. As another example, trade-offs can be seen with competing land-uses, where agricultural development competes with habitat conservation (Turner et al., 2014), with the former being a component of human health and wellbeing through food production and employment provision. In both cases, planners and decision-makers must navigate trade-offs by balancing the opportunity costs of not developing an area against habitat conservation and protection objectives.

3. Applications

The CBH nexus can be used by both practitioners and researchers alike to produce insights for improving integrated planning and policy practices. Practitioners can apply the CBH nexus to different planning and policy challenges and areas (e.g., food, energy, built environment, waste, water, etc.) to facilitate integrated approaches to addressing local challenges and achieving multiple sustainability objectives. Such an application could involve developing a series of questions that aid local government with identifying ways of optimizing co-benefits and minimizing the trade-offs in the planning process. As an example, many communities are exploring ways of improving local walkability through a mixed-density form, particularly those that have historically been considered to be "bedroom" communities in which residents travel to other cities for work, shopping, and recreation (e.g., Dinić and Mitković, 2016; Perrott, 2020). Planners can then use the CBH framework to develop questions that elucidate how their active transportation network and mixed-use zoning plans can provide co-benefits or may result in trade-offs related to climate change mitigation and adaptation, habitat and wildlife protection, and physical and mental health (Table 1). Such an application could be viable way to apply the CBH nexus in planning practice, as it aligns with checklist/toolkit approaches with which local governments are already familiar (e.g., City of North Vancouver, 2015; Town of Gibsons, 2018; Regional District of Nanaimo, n.d.).

Another way that the CBH framework could be used by municipalities is as the basis for developing community indicator systems, these being tools or mechanisms for tracking progress toward local sustainability and wellbeing (Lee et al., 2015). Community indicator systems are often developed through participatory processes that solicit input from stakeholders and local residents on what is important for measuring wellbeing in their particular community; however, best practices also include beginning the indicator system development process with a framework that can be adapted to different local contexts and used to guide indicator identification/selection (Davern et al., 2017). The CBH nexus could (at least in part) serve as a basis for developing a community indicator system, as the framework could be used to ensure that local performance tracking captures critical sustainability issues and imperatives for humans and the environment. In support of this suggestion, Frantzeskaki et al. (2019) noted that community indicator systems can be valuable tools for measuring progress toward climate adaptation and its related socioeconomic and socioecological considerations.

The CBH framework can also be employed in research, and it is currently being used as an analytical lens in a research effort led by the author on integrated local food systems planning (Ghadiri et al., 2022). Such research could involve document analysis, where the framework is applied to identify both areas of integration and gaps in local plans and policies. By way example, Issac et al. (2022) applied document analysis to community sustainability plans of municipalities in British Columbia, Canada, to examine the integration of food and agriculture with other local sustainability objectives in these plans. Their study investigated the presence and absence of food system considerations in relation to other local planning and development areas (e.g., economy, social justice, transportation, etc.), and a similar study could identify such presences/absences with respect to the components of the CBH nexus. As another example, Cleave et al. (2017) investigated key features of the economic development plans of municipalities in Ontario, Canada, and their analysis identified

TABLE 1 Sample questions for guiding integrated transportation mixed-use planning using a climate-biodiversity-health nexus framework.

Intersection	Subdomains	Sample question	References
Climate-health	Mitigation; Physical health	Does the plan involve mixed-use densification to improve walkability and discourage traffic?	Maghelal and Capp (2011)
	Mitigation; Mental health	Does the plan involve a level of densification that can impact local sense of place?	Skrede and Andersen (2022)
	Adaptation; Physical health	Does the plan include sufficient green infrastructure to regulate temperature?	Sharifi (2021)
	Adaptation; Mental health	Does the plan minimize flooding damage to property (and related psychological stress)?	Houghton and Castillo-Salgado (2017)
Climate-biodiversity	Mitigation; Habitat	Does the plan protect greenspaces of sufficient and quality to serve carbon storage functions?	McPherson et al. (2013)
	Mitigation; Wildlife	Does the plan reduce or slow traffic in ways that reduce vehicle-related wildlife mortality?	Lister et al. (2015)
	Adaptation; Habitat	Does the plan include enhancing buffers around riparian paths to protect aquatic ecosystems?	Reynolds et al. (2019)
	Adaptation; Wildlife	Does the plan involve green infrastructure with vegetation that could be invasive species?	Choi et al. (2021)
Biodiversity-health	Habitat; Physical health	Does the plan enhance ecological connectivity through the implementation of greenways?	Newell et al. (2022)
	Habitat; Mental health	Does the plan improve access to nature and greenspace throughout the community?	Jennings et al. (2016)
	Wildlife; Physical health	Does the plan involve vegetation along paths that can contribute to allergy issues?	Dales et al. (2008)
	Wildlife; Mental health	Does the plan enable access to wildlife viewing in ways that do not adversely affect species?	Keniger et al. (2013)

(among other items) goals related to local economic development, such as quality of life and the attraction and retention of talent. A similar, or complementary, analysis could interrogate whether the economic development plans' goals align with those of the CBH nexus (or whether the plans contain any mention or recognition of CBH considerations). Both examples provide cases in which CBH nexus thinking can be applied to planning documents to identify gaps and ways of updating and improving local plans so that they integrate the key sustainability imperatives of the nexus.

In the interest of moving from "nexus thinking" to "nexus doing" (Simpson and Jewitt, 2019), studies that apply the CBH nexus framework could follow a community-based participatory research approach, in which researchers, local government, and stakeholders work together to co-produce practical knowledge for informing planning and policy development (e.g., Newell et al., 2020; Goralnik et al., 2022). Such research could use participatory modeling techniques, where researchers facilitate stakeholder workshops and engage participants in systems mapping of the relationships around a sustainability challenge and/or strategy (e.g., Chase et al., 2010; Cradock-Henry et al., 2020). In turn, these "systems maps" can serve as the basis for quantitative or semi-quantitative models that can be used as decision-support tools (Newell and Picketts, 2020; Castro, 2022). Examples of a such modeling studies include Pluchinotta et al. (2019) use of fuzzy cognitive mapping, a semi-quantitative systems modeling and simulation technique, to examine the implications and compare potential outcomes of different local policy scenarios in Taranto, Italy. The CBH nexus could be applied to this type of research by firstly using the framework to guide the selection of elements and issues to be included in the system model and secondly to identify which outcomes from the scenario modeling that will be examined and compared (i.e., outcomes related to the CBH goals).

The discussion above suggests four ways that the CBH nexus could be applied to local planning and policy practice and research, with these being using the framework for (1) checklists for local developments, (2) creating community indicator systems, (3) planning and policy document analysis, and (4) participatory modeling and scenario analysis. These applications vary in their techniques and approaches; however, there are commonalities with respect to the value that the CBH nexus brings to the applications. Using systems methods to support integrated planning carries a significant challenge of determining what to include in a system (Newell et al., 2020), and similarly, attempting to capture too many metrics in a community indicator system can comprise its effectiveness (Davern et al., 2017). The CBH nexus provides a means for scoping an integrated planning exercise, study, or tool development in ways that facilitate the inclusion of critical sustainability imperatives, while also addressing the overwhelming nature of attempting to comprehensively capture all elements of an urban or community system. Other integrated planning and policy applications of the CBH nexus (i.e., beyond those suggested here) would also benefit from how the framework can be used to define systems boundaries and focal points.

4. Conclusion

This paper presents the CBH nexus framework for supporting research and practice in integrated planning. The framework is not entirely novel in that other nexus frameworks with similar domains/components have been proposed (e.g., Pörtner et al., 2021); however, this paper builds on this previous work to clearly define a goals-oriented framework that (1) responds to critical sustainability challenges of the modern day and (2) can be operationalized in a relatively straightforward manner. Suggestions and examples of how to apply the framework are provided here, but more work and experimentation are needed to determine its best application. As done with the WEF nexus (e.g., Biggs et al., 2015; Slorach et al., 2020; Jaafar, 2021; Mohtar et al., 2022; Nika et al., 2022), future work can identify what is missing from the framework to expand and/or refine it in order to improve its analytical and practical power. Continued experimentation with, and improvement of, this framework will reveal its most useful applications, thereby opening new opportunities for communities to effectively perform and implement integrated sustainability planning and policy.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

Author contributions

The author confirms being the sole contributor of this work and has approved it for publication.

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Conflict of interest

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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