

Article

A Novel Framework for Inner-Outer Sustainability Assessment

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Abstract: Calls for systemic transformations have become prevalent throughout sustainability discourse. Increasingly, these calls point towards consciousness expanding practices and interventions, such as mindfulness, to support the development of individual understandings, skills, and capacities that are conducive to more sustainable ways of being and doing. The growing interest in leveraging inner capacities, including mindsets, worldviews, values, and beliefs for sustainability transformations emerges from concerns that conventional approaches are failing to align social and ecological systems towards long-term viability. Interest in these consciousness-driven transformations is spreading, particularly in governments and prominent organisations. Tempering this enthusiasm are concerns that untethered from moral and ethical guidelines as well as caring understanding of local and global prospects for lasting wellbeing, mindfulness programs, workshops, and interventions for inner transformation can inadvertently strengthen unsustainable systems and deepen inequities. Accordingly, this paper presents an exploratory assessment framework to increase understandings of how events focused on interventions for inner transformation align with broad sustainability requirements. Findings from application of the framework should help to elucidate how these offerings can disrupt normative ways of thinking and doing, and in turn, positively influence multi-scalar transformations. Furthermore, use of the assessment process to plan and/or evaluate inner development offerings is anticipated to help strengthen progress towards sustainability and reduce adverse trade-offs that might undermine positive systemic transformations.

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1. Introduction

As many trends towards unsustainability worsen [1–3], there is growing interest and hope for driving positive systemic change more effectively through the leveraging of inner transformations [4,5]. This enthusiasm stems from the recognition that inner capacities, including values, mindsets, emotions, identities, intentions, sense of place, and beliefs have thus far been largely ignored as leverage points for positive change, and in some cases, insufficiently developed to meet sustainability challenges [6–18].

A growing field of study is hence emerging at the nexus of inner and outer sustainability that offers both contrast and complement to more reductionist scientific solutions that have so far predominated sustainability efforts. For example, while modern attempts to drive systems change—primarily through mechanisms of economic and technological development such as the introduction of hydrocarbon-based energy systems—have revolutionised many aspects of daily life, they have also entrenched a set of ideas and practices that can undermine conditions for sustainability [19]. Interests at the nexus of inner and outer sustainability have therefore begun to encourage inquiry into the role of inner dimensions for more conscious and deliberate cultural transformations [18,20–22].

The notion of transformation has become a buzzword in sustainability discourse [23,24]. For example, prominent organisations, including the United Nations, Intergovernmental Panel on Climate Change (IPCC), and World Wildlife Fund (WWF) have stimulated discussions around the need for systemic transformations to halt destructive activities affecting social and ecological systems at organisational and governmental levels [4,25,26]. Similarly,

change agents in fields ranging from climate science to education to politics are advocating approaches to inner transformation such as mindfulness to cultivate skills and capacities generative to sustainability progress [27–33]. Increasingly, scholars are recognising that sustainability transformations are not only outer change processes, but also inner change processes linked to culture, values, worldviews, and mindsets [11,18,34–38]. How these processes might support transformations in fundamental understandings, behaviours, and practices that could deliver more sustainable futures remains an exciting yet elusive mystery [36].

Transformations can be both disruptive to existing systems—by interfering with and even destroying patterns of relationship—and creative—by giving rise to the emergence of new organisations and patterns [39]. Positive sustainability transformations require significant changes that recontextualise, reconnect, and restructure relationships among people and between people and the environment [6,21,40]. Such profound cultural shifts will require increasing tolerance for complexity to move away from binaries of either/or towards more integrated both/and ways of thinking [41–44]. For example, the common delineation made between “humans” and “nature” reinforces a problematic narrative of separation between humankind and the biosphere [45,46]. By denying the entanglement and interdependence of inner and outer conditions for sustainability across culture, place, and time, this modern story of separation legitimizes systems of oppression and environmental degradation [47]. Moreover, it perpetuates short-sighted individualized modern-colonial satisfactions and securities [48]. Shifting towards a more sustainable paradigm will thus require that collective motivations, capacities, and behaviours are aligned towards the long-term viability of interdependent socio-biophysical systems [6,49,50].

While there is growing demand for solutions to unsustainability, its broad scope of wicked challenges precludes confident predictions as it is often unclear how complex systems will respond to interventions [51–54]. Accordingly, as globalisation amplifies more systemic volatility, uncertainty, complexity, and ambiguity (VUCA), new understanding and skills are likely needed to navigate turbulence and emerging challenges [48,54–60]. Without deeper understanding and contextualisation, it is unlikely that inner development interventions will consistently support beneficial changes for collective wellbeing [61–65]. Wamsler and Restoy (2020), for example, have cautioned that tools, methods, and skills that support social and systemic change ought to be further researched and adapted to reduce potentially harmful impacts of inner transformation interventions including ways to ensure that benefits extend beyond just the individual, and account for context-specific conditions [17]. Thiermann and Sheate (2020) have similarly noted that there is a need for reflexive questioning of epistemological and ontological assumptions brought into this space by researchers, and to reassess how the hypothesised causal links between interventions targeting mindfulness and sustainability are evaluated [66]. Others have cautioned that this “Inward Turn” of sustainability scholarship has over-emphasised individual contributions to both creating and solving global challenges such as climate change, and consequently overlooks structural drivers of environmental devastation [67]. These concerns are consistent with broader critiques of interventions, especially mindfulness, that have been widely prescribed for self-help, inner transformation, and sustainability progress with varying levels of effectiveness and safety [62,64,65,68–76].

Developing a cohesive and critical body of research around what desirable inner transformations entail, how they relate to outer (behavioural, organizational) sustainability transformation and how these insights could translate from academic to social, political and environmental contexts is therefore of timely interest [23,24,74,77–80]. Furthermore, improved understanding would help to promote greater “equity, transparency, and accountability”, which have so far been overlooked in this field ([34], p. 499). Additionally, it could help to reduce harmful misconceptions of transformations as apolitical, inevitable and universally beneficial [23,34,81–85].

Objectives

In this paper, we present an initial evaluative model for assessing whether, how and the extent to which interventions for inner transformation contribute to lasting wellbeing for people and the biosphere. The framework draws on core requirements for sustainability progress from both inner and outer perspectives. The integration of these converging and mutually enhancing requirements seeks to identify synergies, positive feedbacks, and interdependencies to leverage transformations towards long-term viability. Additionally, it seeks to provide the generic criteria for assessment, evaluation, and decision making of inner transformation offerings. Our assessment framework is meant to be complementary to other models that demonstrate the interlinkages between human and planetary health and are concerned with leveraging inner transformation to accelerate systemic change [8,10,18,20,38,86–90].

2. Materials and Methods

An extensive integrative review of literature was conducted from 2018–2022 to identify overlapping characteristics, agendas, and opportunities for mutual support at the nexus of inner and outer transformation [91–95]. While there is a plethora of interventions to develop inner capacities for sustainability, the review process paid particular attention to mindfulness since it is one of the most widely accepted and popular approaches to bridging inner-outer transformation [14]. The literature search occurred primarily across three databases: Google Scholar, Science Direct, and Scopus, and included both scientific papers and grey literature including governmental reports, press releases, and working papers. After scanning abstracts, reading materials, and snowballing sources, relevant publications were identified and analysed [96]. The results of this literature review, in combination with the generic criteria identified in the Inner Development Goals (IDG) model [97], were contextually adapted under the broad categories of sustainability requirements [98–100] into a working framework for integrated inner-outer transformation.

The framework was designed for application in case studies to evaluate how and to what extent both inner and outer sustainability criteria are addressed in deliberations and applications involving interventions for inner transformation (Yin and Campbell, 2018; Stake 2009). Functionally, the framework serves as a matrix to summarise findings and highlight interactions and trade-offs between criteria. The criteria represent interacting considerations and are meant to be used as a package to guide evaluations and decision making [101]. They are not intended for use merely as a checklist to measure progress to inner or outer sustainability targets as if they were independent of each other. While objectives for inner capacities may be described as particular measurable goals, just as indicators of sustainability objectives have been described in the UN Sustainable Development Goals (SDGs) [102], the integrated framework presented here respects interactions. Moreover, it is meant to facilitate identification of overall as well as specific contributions and trade-offs in initiatives that aim to foster progress towards inner and outer sustainability. An additional benefit of the framework is that it can be used to evaluate the new and largely untested IDG model and its potential as a complementary approach to the widely recognized SDGs. Reasonably comprehensive evaluations of IDG applications requires a framework that combines inner and outer sustainability requirements and assesses the extent to which the IDG applications make valuable contributions to lasting wellbeing for all.

3. Rationale and Utility of the Framework

Making conscious the often internalized and implicit inner dimensions that guide decision-making processes is essential for systemic transformation [53,103]. Sustainability assessments help to identify and challenge these mental models through a combination of explicit generic and context-specific criteria. Criteria specifications for the framework were developed for application in inner transformation events with specific attention to contributions to sustainability and take into consideration existing challenges for sustainability transformations, potential effects of interventions (including mindfulness), and implications

for advancing or thwarting progress towards long-term viability [104] (pp. 22–23). The combination of generic sustainability requirements with the IDG criteria inform a transsystemic understanding of the interrelations between inner and outer transformation including vulnerabilities, opportunities, potential effects, and feedbacks [105,106].

The framework presented here is for assessing whether and to what extent interventions to promote inner transformation (such as online mindfulness-based offerings, summits, and programs) address key requirements for long-term viability. Recognizing that both sustainability and inner transformation practices such as mindfulness are aligned more closely with processes than end points, framework-guided assessments should illuminate where interventions could be strengthened, recontextualized, or contextualised anew to support progress towards sustainability. As others have noted “Most often, the products of sustainability assessments act as normative reference points for planning, decision, making and actions” [107] (p. 127). Accordingly, it is imperative for interventions that foster inner transformation to support a notion of “progress” that aligns with intergenerational collective flourishing.

Inner development initiatives, including mindfulness-based interventions, have been correlated with pro-social and pro-environmental behavioural changes that are conducive to sustainability, including reduced consumerism and increased pro-environmental behaviour [108–116]. Similarly, these interventions have been linked to the cultivation of skills and capacities that support collective wellbeing including compassion and empathy [109,117–123]. Despite the preliminary positive effects, concerns have been raised that the rapid dissemination and prescription of consciousness-expanding programs and interventions, particularly mindfulness, have vastly outpaced their scientific support [65,70–72,124–128]. Moreover, there are concerns that when untethered from ethical and moral traditions, practices including mindfulness might undermine conditions for sustainability progress and weaken prosocial and pro-environmental orientations [72,129–135]. For illustration, at the onset of COVID-19, mindfulness demonstrated benefits for reducing stress and anxiety of health care workers but not for transforming the systemic causes of moral injury and burnout that undermined clinician, and by extension, patient wellbeing [136,137]. These and similar tensions are further described in a case study in which we used the framework to evaluate the sustainability contributions of online mindfulness offerings during the pandemic [138].

Applications of this framework would help to inform recommendations for planning, decision making, and applications for future interventions and assessment tools [138,139]. These applications would also identify needs for new capacities, and further initiatives—for example, to foster the resurgence of traditional practices and knowledge that could support epistemically and ontologically diverse, accessible, ethical, and inclusive inner dimensions conducive to sustainability progress [22,27,29,48,140–148].

4. Core Requirements for Inner-Outer Sustainability Transformations

The following two sections of the paper set out the core understandings of sustainability and inner transformation that provide the foundation for the proposed framework and its criteria for designing and evaluating interventions at the nexus of inner and outer sustainability.

Explicit assessment criteria and processes are used in many fields to improve the quality, consistency, and credibility of deliberations and decisions. In applications to inner and outer sustainability transformations, it is especially crucial that the criteria cover matters of both substance and process, incorporate insights from broad learning and experience, and are designed to be critically applied in ways that inform further innovation. The framework’s generic criteria recognize the limitations of global generalisations and the importance of particular contexts and incorporate respect for complexity and uncertainty. Additionally, the criteria are meant to facilitate problem solving that involves diverse stakeholders and reconcile to the extent feasible, diverse conceptions and requirements for both inner and outer sustainability progress [149–152].

Nevertheless, context-specified applications of the criteria should greatly enhance prospects for long-term viability by nurturing inner dimensions supportive of collective flourishing (e.g., compassion empathy, nature connectedness) and outer dimensions that support transformations to regenerative and just socio-ecological (SES) and economic systems [99,153–156]. The results should also encourage and inform attention to the context-specific psycho-cultural and behavioural changes required to support sustainability transformations [36,157,158].

5. Sustainability and Outer Transformation

“An essential notion underlines sustainability assessment. It is to enhance our prospects for lasting wellbeing, mostly by introducing a little more rigour, humility and foresight in our decision making” [104] (p. 1).

History is replete with precautionary tales of the dangers befalling civilizations that tumble into the multipolar traps of unsustainability [159–166]. For millennia, hunter-gather-forager societies and early agriculture maintained evidently more environmentally viable practices by emphasizing the interests of the community over the individual, nurturing kinship with the natural world, and discouraging adoption of untested innovations [167,168]. In contrast, modern approaches to lasting wellbeing, often conceived as sustainable development, operate within a development paradigm that focuses on progressively transforming the economy and society to meet the basic needs of all people in present and future generations [169] (p. 43). This progressivist narrative of sustainability now co-exists with and must confront predominantly consumerist (and colonial) growth-dependent economies that favour the securities and satisfactions of the most advantaged at the expense of the collective and planetary health [48,140].

Over the 35 years since the sustainable development idea was widely embraced by global leaders, needs for transformative change to more viable trajectories have become more urgent [170–172]. While many contrasting approaches and priorities for intentional sustainability transformations have been proposed [173–178], no consensus has emerged on an overall best route to sustainable futures. Given the vast diversity of particular contexts for sustainability transformation, many different combinations of complementary options from a rich suite of possibilities could serve well in particular places and cases. The most promising combinations might often be those that incorporate old and new understandings as well as mobilize both inner and outer capacities.

In this paper, progress towards sustainability is conceived as a suite of processes designed to move local to global conditions and practices towards collective thriving that enhances prerequisites for long-term social and biophysical viability [104,179]. As will be discussed below, the most basic core requirements for moving towards sustainability have been reasonably well established in the sustainability literature, as have the major gaps between current conditions and the basic parameters for sustainability (e.g., as consolidated in the 17 SDGs). However, sustainability as an objective cannot be set out much more precisely. Future sustainability is definable only as a set of intertwined dynamic characteristics to be pursued indefinitely. There is no end goal. Moreover, as suggested above, there may not be one appropriate overall route to sustainability and the most promising ones for particular areas are likely to be diverse and largely context dependent. Given the uncertainties involved, as well as the risks of change for the already least advantaged, an emphasis on very basic substantive criteria and appropriate processes is central to the pursuit of sustainability. Not surprisingly the process characteristics most commonly identified as appropriate for sustainability transformations respect complexity and uncertainty by emphasizing experiment, equity, engagement and iterative learning [180].

At the core of outer sustainability progress are needs to halt unsustainable activities; reverse unsustainable trends; and implement alternatives that enhance prospects for future as well as present wellbeing, while also maintaining and strengthening desirable current social, ecological, and socio-ecological characteristics and relations, protecting the vulnerable, and respecting uncertainties [104]. To be effective, approaches to meet these three core needs

require appreciation for complexity, resilience, context-specificity, and an understanding of the interdependencies across social and ecological systems [51,52,154,176,181–184,184–187]. Supporting positive transformations also entails the nurturing of various inner capacities such as awareness, compassion, empathy, and intercultural competencies that have been largely absent in mainstream sustainability discourse [12,87,89,149,188]. The transformation of inner dimensions will need to be pursued, much like sustainability, as iterative processes and practices as opposed to static goals in order to mitigate undesirable trade-offs [15,17,18,23,34,38,149,189–191].

In addition to inner transformation, progress towards sustainability requires cultural change (e.g., towards integration vs balancing, and informed engagement vs top-down dictation or consumerist fragmentation). The cultural changes would be accompanied by structural changes (e.g., for access to greenspace vs concrete jungles, local food systems vs global commodity chains, active transportation vs private cars) and socio-politico-economic shifts (e.g., narrowed gaps between wealthy and poor, and between the influential and the powerless). In these contexts, inner transformations should help to build capacity for both cultural and broader systemic shifts [24,184,185,188,192].

5.1. Common Approaches to Sustainability

A broad diversity of modern sustainability conceptions has emerged. While some of these conceptions are presented as merely descriptive, most if not all, at least imply particular ways of framing sustainability as an objective for the purposes of understanding current and anticipated needs and opportunities, and guiding deliberations and decision making on what to do. More specific applications include establishing frameworks for evaluating whether and to what extent particular initiatives would contribute to progress towards sustainability. Here we provide a brief overview of this landscape. The intent is to clarify the context and to summarize our grounds for selecting the approach to sustainability that underlies the framework proposed below.

Successive reviews of the sustainability literature, particularly the literature on sustainability-based evaluations and assessment [101,193–196] indicate that the most familiar and influential conceptions of sustainability for the purposes outlined above fall into three loosely bounded and overlapping groupings: approaches that are centred on pillars, indicators or requirements.

5.2. Pillars-Based Approaches to Sustainability

Pillars-based approaches [197–199] focus on advancing attention to individual categories of expertise and government mandates. They apply the common notion of sustainability as built on pillars—usually three: environmental, social and economic—with sustainability depicted as a lintel across the top of the pillars (or as the intersection of overlapping “pillar” circles in Venn diagram versions). The pillars emerged soon after the WCED report was released in 1987 [194] and are still used as an introductory model, and as the basic structures for more detailed sustainability reporting and evaluations. Private sector applications include “triple bottom line” versions that sometimes rename the pillars as profit, people, and planet [197,200]. As a basic conception of sustainability, the three pillars have the considerable advantage of familiarity. Environmental, social and economic are established categories of expertise, mandate and data collection. Easy access to existing expertise and fit with the powers and expectations of relevant authorities can facilitate mobilization of support and capacity for sustainability applications. Elaboration of particular considerations within the three categories is accordingly convenient.

The pillars also have limitations. Not all important sustainability considerations fit into the standard three pillars. Health, culture and governance, for example, are often found to merit their own pillar or the equivalent [195,201]. Also, the pillars (however many are identified) represent only broad topic areas, while applications typically need goals and/or desired directions for change. Most significantly for advanced applications, the pillars approach is limited by preservation of well-entrenched separate silos that discour-

age attention to interactions and interdependencies among sustainability concerns and solutions. Neglect of interactions and interdependencies compromises applications where understanding of real-world complexities, risks and opportunities is crucial. Interactive effects and interdependencies have been at the centre of sustainability considerations at least since WCED built its proposals for sustainable development on recognition that protecting the environment and eliminating poverty were intertwined and possible only if both were pursued together. Finally, pillars-based approaches to sustainability are often associated with the notion that environmental, social and economic objectives necessarily conflict and consequently need to be “balanced”—again suggesting a departure from the WCED’s concept of interdependent and mutually supporting environmental, social and economic initiatives for sustainability.

5.3. Indicators-Based Approaches to Sustainability

Indicator based approaches identify needs or goals for moving towards sustainability and track sustainability progress through (usually) measurable objectives with the purpose of guiding and monitoring the effectiveness of different interventions. These approaches typically begin with major areas of sustainability concern that have been tracked for some time. The associated needs and goals may be organized under the pillars categories. But because the selection of indicators areas is driven by concerns (e.g., climate change), rather than established disciplines or mandates, indicator-based approaches are open to multiple options for defining the needs, goals, and associated indicators and for organizing them into an overall framework. The results can still be silos of separate objectives and indicators with separate initiatives for action and separate monitoring and reporting. Innovative attention to interactions and interdependences may also be discouraged by the practical demands for indicators that rest on well-established long-term data sets. But as has been demonstrated with climate change, sufficient concern can lead to quite rapid and effective mobilisation and application of old data for new purposes [202,203].

The indicators approach is now well represented by the UN’s high profile and broadly supported SDGs [204]. Adopted by the United Nations in 2015, the SDGs began with an initially pillars-based purpose to address social, ecological, and economic dimensions of sustainability and provide a “blueprint for peace and prosperity for people and the planet, now and into the future” [204]. But the core substance of the SDGs expands from the earlier Millennium Development Goals [205] to present 17 goals and 169 non-binding targets to orient humanity’s efforts towards viable futures [206–209]. The focus is on measurable progress in closing gaps and reversing unsustainable trajectories related to each area.

The SDGs also combine requirements for progress towards sustainability (phrased as goals) with indicators (especially associated with the targets for each goal, though not all targets have easily quantified indicators) [210–212]. As a top-down initiative, the global SDGs are not automatically well-linked to bottom-up sustainability initiatives. However, they are clearly valuable as a foundation for global deliberations and monitoring, for setting more specific national and sub-national responsibilities and commitments, identifying pathways to meeting the more specific goals, and for encouraging cooperation and accountability.

Also, the SDGs could be a starting point for more advanced recognition of and action on interactions and interdependencies. The extent to which this will happen remains to be seen. Despite UN statements that the goals are interdependent [204] the SDGs are typically presented in 17 separate coloured boxes and progress is to be monitored in those categories. Advocates of more effective steps to ensure attention to interactions and interdependencies have recommended reconfigure the SDGs, for example, into a more systemic and constellated model to foster efforts to identify and maximise synergies and beneficial feedbacks in initiatives to address multiple goals at once [194,207,213–222]. Such approaches would recognize spatial and temporal interactions across social and ecological systems [43,99]. That in turn would facilitate greater appreciation of change-making in complex systems [223], including how to build the resilience of desirable system structures, functions and interac-

tions [185,224–230] and encourage transformation of problematic systems that disadvantage vulnerable people and ecologies [13,21,100,141,149,181,231–236]—in efforts to meet all the goals in mutually supporting ways [43,142,143,153,185,229,237–239]. For example, positive gains have been made in panda conservation because of greater attention to complexity, resiliency, and adaptability, with benefits for both residents and the local ecology [240,241].

When indicators-based approaches to sustainability fail to focus on positive interactions among the goals being tracked, they miss opportunities to avoid trade-offs. Commentators on the SDGs have observed that focusing on individual goals can create conditions for conflict and trade-offs that compromise substantive progress for collective wellbeing [154,209,213,220,242]. For example, “pursuing sustained, inclusive and sustainable economic growth, full productive employment and decent work for all” (SDG8) will make it challenging to meet the other goals (e.g., progress on climate change (SDG 13)) and is likely to entail trade-offs where growth and livelihood gains are made at the expense of progress on the other crucial fronts [232,243,244].

5.4. Requirements-Based Approaches to Sustainability

This study seeks to expand the synthesis of widely recognised and commonly accepted sustainability requirements developed by Gibson et al., [98,100,104] to encompass both inner and outer criteria for sustainability progress. The purpose of requirements-based sustainability approaches is to bring attention to what is needed to support lasting wellbeing from local to global scales. This approach identifies mutually beneficial core criteria, synergistic benefits, underlying tensions, and trade-offs. Whilst requirements-based assessment models encapsulate most of the core aspirations of the MDGs and SDGs, as well as the various pillars/circles frameworks, they place much greater attention to the relational qualities of criteria and influence of increasing uncertainties and complexities. Requirements-centred models are designed to recognise complexities, reduce trade-offs, and bring attention to concerns and opportunities that would otherwise be made invisible through more fragmented forms of analysis [100,197,206,245–249]. The advantages of this approach are directly correlated to the strength and comprehensiveness of the package of principles and criteria they are assessing [104]. Accordingly, case and context specificity are key in requirements-based assessments.

5.5. Integrated Requirements-Based Approaches to Sustainability

Integrated requirements-based approaches typically focus on the core generic requirements for progress towards sustainability while also paying attention to relations among the requirements, seeking mutually supportive effects, and avoiding tensions, and trade-offs [98,104,246]. Though not often identified as a particular approach to sustainability, integrated treatment of requirements is widely evident in practice. These approaches are typified by the identification of a set of objectives for responding to a suite of sustainability-related problems and/or opportunities and treating these objectives as a package of requirements. The requirements may be phrased as criteria for identifying suitable response options, selecting the best one, and guiding its implementation. The focus is on maximizing overall contributions to sustainability by seeking multiple, mutually reinforcing and lasting gains while avoiding or mitigating trade-offs.

Treatment of the needs or requirements as an integrated package may be adopted with broad conceptual as well as practical recognition that progress towards sustainability requires simultaneous and at least compatible advances to respect biosphere and human needs and reverse destructive trajectories [177,250–252]. As noted above, an earlier version of that understanding also underlies the WCED’s initial conception of sustainable development that protects the environment while also providing enough for all. However, integrated requirements-based approaches have also been driven by the character of immediate challenges at the local and regional scales, where existing structures and practices are failing, initiatives reflecting new approaches are needed, and multiple objectives must be served by those initiatives. Accordingly, venues for application have covered a wide

diversity of contexts where authorities and stakeholders face demands or expectations to address multiple needs for stewardship and change, and to apply foresight. Integrated requirements-based approaches have been valuable in urban and regional planning, especially where cities face growth demands that cannot be met in established ways without compromising affordability and quality of life [239,253,254] in regional land use planning, including where there evident needs for changes to enhance prospects for viable economic and ecological futures [255]; in rural areas where there may be competing options for food and agricultural systems [256,257] and in evaluations of poverty reduction strategies including at the national scale [258]. Sustainability-based assessments using requirements-based criteria and seeking positive interactions have also been designed and undertaken for project-planning and assessments, in mining [245,259] hydrocarbon extraction and transportation, and hydropower development [260].

Given the breadth of potential applications, requirements-based approaches depend on a combination of respect for the widely-recognized general requirements for progress towards sustainability in the world and careful attention to the specifics of case and place. While a reasonably comprehensive generic set of sustainability requirements or criteria can be framed in many ways, the essential components, and the significance of their interactions, are by now well documented in the extensive literature on sustainability understanding and experience. For the purposes of this paper, we adopt the synthesis presented in Gibson et al. (2005, 2017, 2020) because it is expressly designed for specification for particular cases and contexts and has been widely tested in practical applications with such specification [100,209,210,248,261–266]. This approach not only offers a synthesised conception of core requirements for supporting lasting wellbeing (see Table 1), but unlike most conventional assessment frameworks, emphasises potential for positive feedback and mutually supportive gains. Additionally, the approach offers a complexity-informed and contextually-adaptive process for assessing evaluations and decision making related to sustainability progress [267]. This criteria set is adaptable to any undertaking and is appropriate for all stages of the assessment process [100,232].

Table 1. Core Sustainability Criteria.

Core Sustainability Criteria
Life support: Build human-ecological relations that establish and maintain the long-term integrity of socio-biophysical systems.
Livelihood sufficiency and opportunity: Ensure that everyone has enough for a decent life and opportunities to seek improvements in ways that do not compromise the opportunities of future generations.
Intragenerational equity: Pursue sufficiency and opportunity for all people (especially the economically and politically poor) in manners that reduce gaps in health, security, social recognition, political influence.
Intergenerational equity: Favour present options and actions that are most likely to preserve or enhance the capabilities of all people to live sustainably while reducing dangerous gaps in sufficiency and opportunity.
Resource maintenance and efficiency: Provide a larger base for ensuring sustainable livelihoods for all while reducing threats to the long-term integrity of socio-ecological systems.
Understanding, commitment, and engagement: Build the capacity, motivation, and habitual inclination of individuals, communities and other collective governing bodies to apply more open and better-informed sensemaking.
Precaution and adaptation: Avoid poorly understood solutions where there is potential for serious or irreversible damage to collective wellbeing by respecting complexity and uncertainty.
Immediate and long-term integration: Attempt to meet all requirements for sustainability simultaneously.
Adapted from [98,100,104,245].

6. Inner Capacities for Sustainability Transformations

Despite decades of sustainability science and practice, progress towards lasting wellbeing for all remains a distant target [252,268–270]. Deepening rates of poverty and privation, compounded by challenges ranging from climate change to loss of biological diversity, are undermining conditions for long-term viability [4,5,271]. These observations are not to dismiss or discredit the many benefits of science and technology. Rather, the intention is to emphasise that a transformation of inner dimensions is needed to support individual and collective behaviour change. Furthermore, this shift is essential for increasing

understanding of socio-ecological challenges and their structural drivers, as well as for mobilising desirable transformations within these systems [272–275]. These shifts in mindsets are driven by inner capacities and are often supported through spiritual, religious, and traditional practices [18,79,276].

Accordingly, a more holistic approach to systems transformations is surfacing, with evident potential to support a linking of the “inner” and “outer” dimensions of sustainability” [11,12,16,27,277,278]. The associated body of research recognises that sustainability initiatives and accomplishments so far have been insufficient to drive the transformative changes required to support a viable future, in part because of their emphasis on outer change—technology, governance, economics—and neglect of the inner dimensions that influence behaviours [35,49]. Transformations in these contexts are described as processes that result in profound shifts in human and environmental relationships [279]. These shifts can be disorienting, especially when they encourage new ways of seeing and being that contrast with the dominant social paradigm (and even with some of the established sustainability discourse) [280,281].

The Inner Development Goals (IDGs)

Complementary to this process is a call to bring greater awareness to inner dimensions, including mindsets, values, and worldviews that influence transformative pathways and conceptions of sustainability [15,18,22,34,282–285]. A requirements-based model of inner-outer sustainability has yet to be measured or researched systematically. Since causal pathways between inner and outer transformation are complex and nonlinear, they are difficult to quantify at varying scales and project stages. Unlike sustainability indicators, many measures of inner development, including mindfulness, are subjective and self-reported [158,286,287]. Accordingly, there is a lack of overarching metrics and targets to track for assessing degrees of inner change. Such challenges make sustainability requirements-based models more appropriate for assessing initiatives seeking progress towards Inner Development Goals than indicator-based models.

The Inner Development Goals (IDGs) were founded in 2020 as a not-for-profit initiative concerned with the need to cultivate new skills and capacities (cognitive, emotional, and others) to address urgent sustainability challenges and accelerate progress with the SDGs [97,288]. This initiative recognises that “there is a blind spot in our efforts to create a sustainable global society”, and that despite the plethora of knowledge around what could and should be done to support collective wellbeing, progress has so far been underwhelming [97] (p. 3). Similar to the SDGs, the IDGs are based on a development model—namely adult development [289]—and are composed of 23 skills and qualities that have been organised in five clusters (see Table 2).

Table 2. The Inner Development Goals (IDGs).

(1) Being—Relationship to Self: Cultivating our inner life and developing and deepening our relationship to our thoughts, feelings and body help us be present, intentional and non-reactive when we face complexity.
(2) Thinking—Cognitive Skills: Developing our cognitive skills by taking different perspectives, evaluating information and making sense of the world as an interconnected whole is essential for wise decision-making.
(3) Relating—Caring for Others and the World: Appreciating, caring for and feeling connected to others, such as neighbours, future generations or the biosphere, helps us create more just and sustainable systems and societies for everyone.
(4) Collaborating—Social Skills: To make progress on shared concerns, we need to develop our abilities to include, hold space and communicate with stakeholders with different values, skills and competencies.
(5) Acting—Driving Change: Qualities such as courage and optimism help us acquire true agency, break old patterns, generate original ideas and act with persistence in uncertain times.
[97].

While built as a goals-based parallel model to the SDGs, the IDGs are actually less focused on measuring specific goals and targets than they are on identifying core skills,

capacities, and practices that can help accelerate sustainability progress at large. In such a context, the IDGs may be better conceived as Inner Development Criteria as opposed to Inner Development Goals. Accordingly, the IDGs are well paired with requirements-based sustainability models than they are indicator models such as the SDGs. Nonetheless, the IDGs are meant to support the cultivation of capacities, tools, and interventions needed to enable conditions for inner growth that are conducive to sustainability progress [97]. Moreover, these goals explicitly address the highly contextual nature of learning and change that are centred on acquiring the skills and qualities needed to take on sustainability tasks and roles may involve diverse challenges for different people and organisations [97].

Similar to the SDGs, the IDGs separate relational elements and place skills and qualities for human development into thematic boxes. By teasing apart complex and entangled relational systems, this framework, much like the SDG model, risks overlooking interdependencies, synergies, and opportunities for intervention. Additionally, it could perpetuate dominant ways of thinking that homogenise and itemise experiences and skills instead of holding space for a multiplicity of understandings. However, unlike the SDGs where interactions between inner and outer dimensions are often given little attention, several of the IDGs explicitly link individual development with collective wellbeing. For example, under the category of “Being” is “Inner Compass”, a quality described as “Having a deeply felt sense of responsibility and commitment to values and purposes relating to the good of the whole” [97] (p. 13). The IDGs offer a complementary toolkit that highlights development paths including practices, tools, and interventions (mindfulness, cognitive behavioural therapy, compassion training, etc.) to help cultivate different skills and capacities (none of which are explicitly assessed or measured as goals or targets).

Despite being curated from a multitude of existing approaches with extensive scientific support, the IDG framework is new and has yet to be rigorously studied as an empirical model. The IDGs were crowdsourced with inputs from over 3000 people, the majority of whom from Sweden, USA, and other relatively wealthy Western countries [97]. Consequently, the model may represent a strong bias towards Western conceptions of development, wellbeing, sustainability, innovation, and processes for mindset shifts [97]. Still, the IDGs represent an impressive package of inner development criteria and approaches that has yet to be matched elsewhere. Pairing the IDGs with the generic outer sustainability model also tests the comprehensiveness of the inner development model and invites discussions around its strengths and limitations.

There is growing excitement for this novel model of inner development including formal commitment by Costa Rica to work with the IDGs [290]. Similarly, a European Parliamentary Report (2022) recently recommended the IDGs to advance SDG 17 “in the framework of global partnerships and capacity building, the innovative role of open-source initiatives, such as the Inner Development Goals initiative, that aim to educate, inspire and empower people to be a positive force for change in society, thereby accelerating progress towards achieving the SDGs” [291].

7. Results

Using sustainability assessment as a guiding approach, the following integrative framework (Table 3) was designed to explore conditions for inner and outer transformation. The framework addresses the benefits that are to be gained and the kinds of risks and dangers that ought to be prevented in the offering of interventions at the nexus of inner-outer sustainability [245]. These considerations are seen as interdependent and inseparable. By bringing together the IDGs [97] and the core requirements for outer sustainability informed by models such as the MDGs, SDGs, and decades of sustainability scholarship as summarised by Gibson et al. [98,100] and the IDGs [97], this is the first framework to offer a basis for developing and assessing inner-outer interventions. Framework considerations involving decision making, trade-offs, and complexities informing the assessment of interventions are further described below.

Table 3 outlines the basic requirements for inner-outer sustainability progress that we have identified as essential for assessment purposes and presents them as criteria for evaluating current and proposed activities and initiatives. It also sets out illustrative implications for the evaluation of inner sustainability interventions.

Table 3. Basic inner-outer sustainability assessment criteria.

Life support

Requirement: Build human-ecological relations that establish and maintain the long-term integrity of socio-biophysical systems.

Illustrative implications:

- **Being:** reflexively and honestly examining the impacts of thoughts and behaviours on the lasting wellbeing of all;
- **Thinking:** developing complexity tolerance and an appreciation for entanglement within broader social and biophysical systems;
- **Relating:** nurturing a sense of concern, gratitude, and reciprocity with all members of the community and the biosphere;
- **Collaborating:** strengthening engagement between diverse and potentially rivalrous groups to constructively manage conflicts that endanger social and ecological systems (SES); and
- **Acting:** disrupting unsustainable ways of thinking and doing, discouraging behaviours that undermine conditions for lasting wellbeing, and driving positive action at all scales.

Livelihood sufficiency and opportunity

Requirement: Ensure that everyone has enough for a decent life and opportunities to seek improvements in ways that do not compromise the opportunities of future generations.

Illustrative implications:

- **Being:** influencing values, mindsets, and lifestyle choices to enhance attention to the wellbeing of the collective;
- **Thinking:** strengthening understanding and other capacities for weighing the impacts of thoughts and actions on other people and the natural world;
- **Relating:** increasing empathetic and compassionate concern for, and commitment to enhancing, the wellbeing of SES;
- **Collaborating:** creating safe and lasting conditions for inter-generational healing, collaboration, and trust-building; and
- **Acting:** consciously choosing a meaningful and fulfilling approach to life that does not undermine conditions for others to do the same.

Intragenerational and intergenerational equity

Requirement: Favour present options and actions that are most likely to preserve or enhance the capabilities of all people to live sustainably while reducing dangerous gaps in sufficiency and opportunity.

Illustrative implications:

- **Being:** deepening empathy, compassion, and presence;
 - **Thinking:** increasing understanding of how contributions to sustainability can and should create spirals of equity and wellbeing;
 - **Relating:** increasing humility, concern, and commitment to reducing the suffering and strengthening the foundations for greater opportunities for present and future generations;
 - **Collaborating:** cultivating skills for compassionate, healing, and generative dialogue between diverse groups; and
 - **Acting:** challenging and dismantling systems of oppression and building equitable replacements.
-

Table 3. Cont.

Resource maintenance and efficiency

Requirement: Provide a larger base for ensuring sustainable livelihoods for all while reducing threats to the long-term integrity of socio-ecological systems.

Illustrative implications:

- **Being:** linking concern for the individual to the lasting collective interests of all;
- **Thinking:** encouraging more informed decisions with consumption patterns of both materials and information;
- **Relating:** minimising negative impacts and maximising positive sustainability effects of individual behaviours;
- **Collaborating:** mobilising energy and resources to vulnerable communities who have been systematically oppressed; and
- **Acting:** increasing awareness of the unsustainability of many normalised behaviours and the availability of positive alternatives.

Understanding, commitment, and engagement

Requirement: Build the capacity, motivation, and habitual inclination of individuals, communities, and other collective governing bodies to apply sustainability principles through more open and better-informed sensemaking.

Illustrative implications:

- **Being:** nurturing sense of responsibility and commitment to lasting wellbeing for all;
- **Thinking:** encouraging greater discernment and agency to critically examine contradictory, incomplete, complex, and ambiguous information;
- **Relating:** living in a meaningful way that enhances conditions for collective wellbeing;
- **Collaborating:** facilitating conflict resolution, problem solving, trust-building, and mutual aid; and
- **Acting:** nurturing courage, optimism, and hope for positive innovations.

Precaution and adaptation

Requirement: Respect uncertainty and avoid pursuing poorly understood risks where there is potential for serious or irreversible damage to lasting wellbeing for all by designing for surprise and managing for adaptation.

Illustrative implications:

- **Being:** cultivating presence, intention, and active but respectful engagement with complexity;
 - **Thinking:** developing agency to make well-informed and non-reactive decisions in challenging situations;
 - **Relating:** increasing concern for the most vulnerable and increasing commitment to reducing threat exposure;
 - **Collaborating:** encouraging and facilitating joint efforts for low-risk, adaptable, and just transitions;
 - **Acting:** cultivating resilience and embracing the richness of complexity.
-

Table 3. Cont.

Immediate and long-term integration
<p>Requirement: Attempt to meet all requirements for sustainability together as a set of interdependent parts, seeking mutually supportive benefits.</p> <p>Illustrative implications:</p> <ul style="list-style-type: none"> • Being: attuning to present conditions with consideration for future impacts; • Thinking: considering the impacts of decisions making on the full range of sustainability considerations and making multiple mutually reinforcing contributions to both present and future wellbeing; • Relating: building personal satisfactions through just, equitable, joyful, and farsighted relations; • Collaborating: nurturing conditions for healing past and present traumas, fostering peace, and building trustful relationships across diverse groups; • Acting: seeking multiple, mutually reinforcing gains; sustaining patience, determination, stamina, and optimism for change. <p>References: Inner Development Goals and requirements adapted from [97], core sustainability criteria and requirements adapted from [98,100,104,245].</p>

To complement and clarify the general requirements for inner and outer sustainability criteria outlined in Tables 3 and 4, below, provides three guiding questions to guide the assessment process and discussion of key considerations related to decision making, trade-offs and complexity. These elements support equal and integrated consideration of the different criteria outlined in Table 3. Given the complexities of identifying and taking informed steps towards sustainability, it is unlikely that all interventions will be able to meet the entire package of criteria. While trade-offs among the criteria are discouraged to the extent possible, they may be unavoidable and will need to be assessed and mitigated on a case-by-case basis. Some preliminary considerations to guide these trade-offs, including decision making and responding to complexities, are presented in Table 4.

Table 4. Integration of basic assessment criteria for assessing interventions at the nexus of inner-outer sustainability.

<p>Guiding questions for assessment:</p> <ul style="list-style-type: none"> • How might the interventions support sustainability transformations at personal and collective levels? • How might interventions undermine conditions for lasting viability? • How might interventions be enhanced to support progress towards sustainability? <p>Note on terminology:</p> <ul style="list-style-type: none"> • Interventions in this framework are broadly conceived as any summit, workshop, practice, program, therapeutic approach, or modality either prescribed or pursued for the purposes of inner development and outer change. The term intervention, while imperfect and perhaps even confusing in some contexts, was chosen for the following reasons: • To intervene means to take action for the purpose of changing, most commonly to improve, a situation. • In social contexts, interventions are commonly used to interrupt destructive repetitive behaviours such as addictions that undermine conditions for wellbeing. • Interventions from a systems perspective are deliberate or accidental changes that occur between two or more phenomena that impact the larger systemic configurations [292].

Table 4. Cont.

Contributions to decision making: Increasing capacities to identify and explore positive new ways of seeing, being, and doing in established processes through conscious application of mindsets, values, and worldviews that inform sustainability-based comparative evaluations of alternatives by:

- Recognising requirements for lasting wellbeing for all;
- Nurturing capacities for self-regulation to reduce the frequency and impact of mindless and reactionary impulses that result in behaviours and conditions that threaten social and ecological wellbeing;
- Helping individuals cultivate agency, discernment, and sensemaking that are required to diffuse rivalries between groups and shift towards deeper understanding, appreciation, and compassion;
- Developing capacities to leverage inner and outer capacities for sustainability progress with greater awareness, accountability, and responsibility;
- Challenging dominant worldviews and systems that undermine conditions for inter and intergenerational equity including coloniality and systemic violence.

Trade-offs: Managing and reducing trade-offs while maximising opportunities for synergies to meet multiple goals and targets. Unacceptable trade-offs in interventions are those that reinforce unsustainable ways of thinking and doing. These include but are not limited to:

- Strengthening conceptions of wellbeing that prioritise development paradigms;
- Reinforcing systems that undermine conditions for lasting wellbeing;
- Encouraging a notion of wellbeing and personal development that is individualised, elitist, and/or focused exclusively on improving personal conditions;
- Triggering undesirable reactions such as escapism, denial, powerlessness, overwhelm, apathy, despair, solipsism, re-traumatization, etc., especially without safe and accessible support;
- Offering prescriptive and simplified solutions for complex challenges; and
- Facilitating behaviours or favouring options that displace adverse social and biophysical conditions or consequences to future generations or to the less advantaged in the present.

Complexities: Mindfully responding to increasingly volatile, uncertain, complex, and ambiguous sustainability challenges through the cultivation of:

- Leadership capacities to detect, prevent, mitigate, and adapt to emerging threats;
- Skills and stamina needed to address the urgency, scale, wickedness of multifaceted interwoven sustainability issues;
- Humility to recognise limitations of one's skills, knowledge and understanding, and to seek support, as needed;
- Tolerance and comfort with complexity to contend with paradoxical and incomplete information with many known unknowns and unknown unknowns;
- Discernment to critically assess conflicting, simplified, or misrepresented information;
- Presence to remain open and grounded in polarised, contentious, and/or inter-cultural deliberations;
- Self-reflexivity to recognise the ramifications of one's decisions for social and ecological systems;
- Accountability to accept responsibility for one's complicity in unsustainability;
- Capacity to build relations of respect, trust, mutual aid, and joint problem solving; and
- Confidence in cultivating a meaningful life enriched with creativity, laughter, and joy.

Together, Tables 3 and 4 outline key requirements and guiding approaches to undertaking sustainability assessments on interventions operating at the intersection of inner and outer transformation.

8. Discussion

The framework presented here identifies criteria, categories, and guiding considerations for assessing the effects of inner transformation interventions on sustainability progress. Initial application of the model [138] demonstrated its utility for identifying cumulative effects and trade-offs. While there are inherent risks associated with the distillation of rich social and ecological interactions into separate boxes, the proposed matrix offers a loosely structured approach to explore emergent questions and summarise key findings.

As we and others have noted, many of the issues concerning sustainability are complex, ambiguous, paradoxical, and often contentious. How to measure the effectiveness of interventions for inner transformation compounds these challenges by adding more philosophical questions such as what is compassion, how is it identified, recognized and assessed, and what is the relationship between compassion and sustainability? Also, given that most assessments operate under temporal, geographical, and fiscal constraints, how could external pressures impact the cultivation and quality of different skills, competencies, and values? Along these lines of inquiry are questions related to who should be using the assessment framework and who decides what kinds of skills, values, and competencies should be strengthened? Moreover, how might the model be strengthened to prevent co-optation by agendas that could support or reproduce unsustainable patterns of exploitation and oppression? Accordingly, we caution that attempts to decontextualise or universalise inner dimensions, or attempts to quantify them as separate ‘goals’, ought to be avoided.

9. Conclusions

As social and ecological challenges intensify, so too do calls for transformative change across disciplines and sectors [23]. Complementary responses to the urgent need to shift towards more sustainable ways of being and doing have identified a relatively unexplored leverage point for systemic change [12,38,66]. Increasingly, sustainability transformations are linked with inner development and the cultivation of skills, capacities, and values that support present and long-term collective wellbeing [10,18,293]. The plethora of inner transformation offerings, ranging from mindfulness programs to adult cognitive development, is rapidly increasing with various levels of attention to sustainability requirements. Because no further deepening of unsustainable trajectories can be tolerated in these critical times, it is essential to have anticipatory and preventative measures, including assessments, in place to strengthen positive inner-outer sustainability links and to avoid and mitigate the reinforcement of any potential trade-offs or negative transformations in interventions.

The assessment framework presented here was developed to examine how and to what extent different interventions at the nexus of inner-outer sustainability support progress towards flourishing social and ecological systems. The framework brings together essential criteria for outer transformations—as informed by core sustainability requirements [98,100,104] and inner transformations—as informed by the Inner Development Goals [97]. By identifying opportunities for innovation, mutually supportive benefits, deepened understanding and commitment, and enhanced capacities for goal realisation, the proposed framework provides a novel evaluative lens to investigate the nexus of inner and outer sustainability.

The primary value of the framework is to assess how individual (or particular sets of) interventions are supporting or undermining sustainability advancement. Because the framework is intended to be adapted on a case-by-case basis, it represents a practical model that can be applied to interventions at any stage. The framework has already demonstrated its suitability for evaluating mindfulness-based case studies [138]. As such, we recommend that testing expand to other offerings concerned with inner development.

A systematic review of the different methods, practices, and interventions for inner transformation is likely also needed to track how different interventions and methods are moving sustainability in “the right direction”. Future insights gathered through the assessment process are anticipated to be beneficial not only for improving inner development offerings but also for strengthening sustainability-focused interventions.

The framework is proposed as a modest working model, subject to iterative review in light of experience and enhanced understanding. While initial testing has demonstrated positive empirical support, more studies are needed. Applications across a variety of interventions, along with revisions and adaptations are anticipated and encouraged.

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