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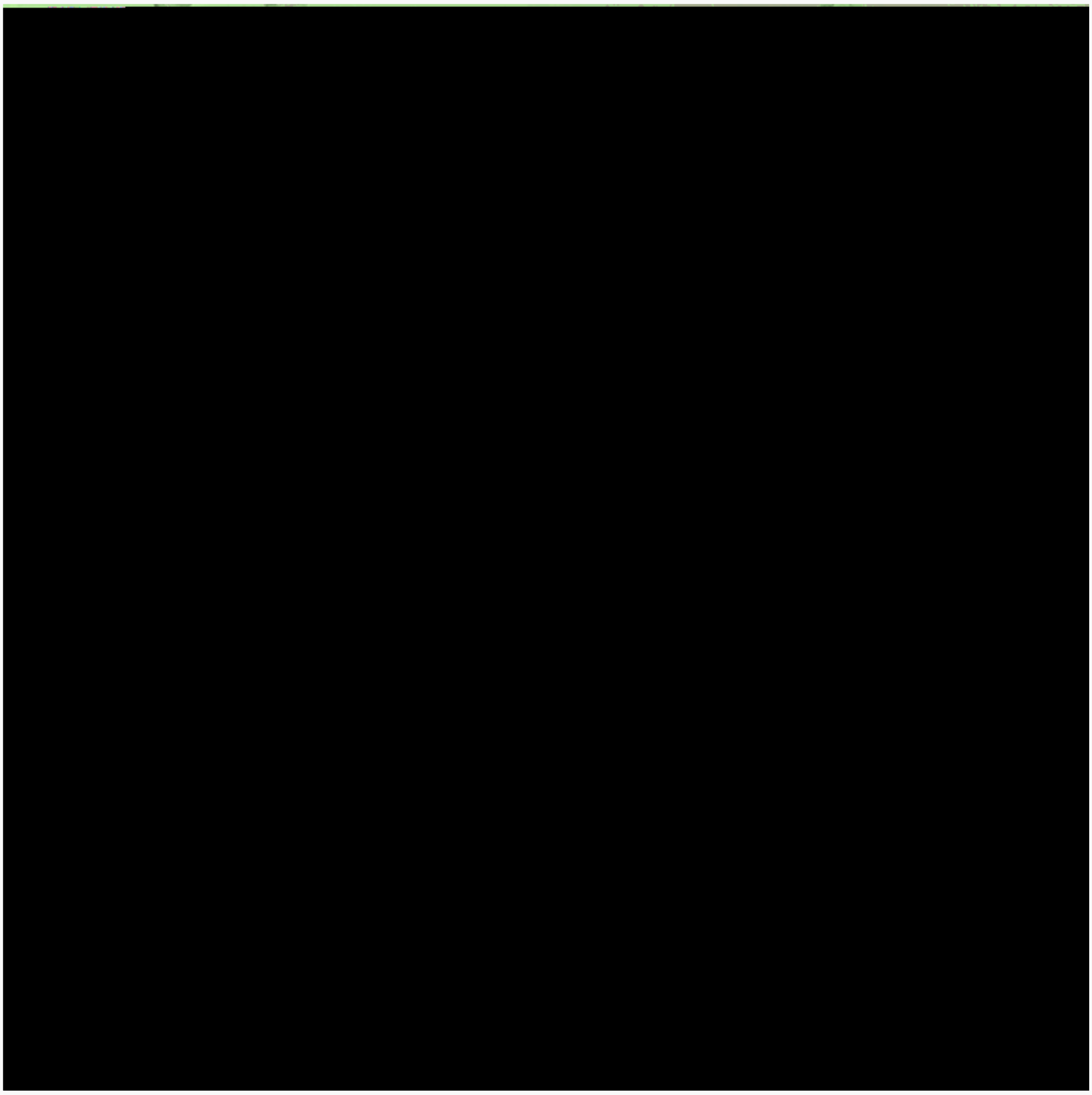
DEVELOPING SUSTAINABILITY INDICATORS–THE NEED FOR RADICAL TRANSPARENCY



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Abstract

There is a strong impetus to adopt sustainability targets and measures across primary industries. Measuring sustainability demands the development of indicators. Conventional approaches to the development of sustainability indicators (SI) are technocratic, which thwarts the open and critical development of SI. Specifically, the technocratic approach: precludes debate concerning the

The impetus for this paper emerged while working in a cross-cultural and multidisciplinary team to develop a sustainability dashboard for a group of primary industries in New Zealand. This program involved academics from economics, social science, ecology, cultural studies, engineering and agribusiness disciplines as well as industry representatives and primary producers (see Whitehead et al. 2019 for final synthesis report of the program).[1] The authors worked with a large farming business owned by Ngāi Tahu (a Māori tribe) to develop a culturally-aligned online sustainability assessment and reporting system which also interfaced with 'Western' sustainability audit systems. The process of developing an indigenous sustainability indicator suite appears at first sight to be a technical exercise whereby different disciplines select or formulate sustainability indicators (SIs) pertinent to their field and to the type of farming activity. Building a dashboard is then presumably a straightforward process of graphically representing these indicators to demonstrate the performance of a farm, or a cohort of farms that represent the performance of an industry. However, building a sustainability dashboard is not this straight-forward. The decisions concerning what indicators to select or develop are based upon value-judgements of what is to be sustained and for whom – a political process. There is significant uncertainty concerning fidelity of various indicators and measures, and areas where important properties of socioecological systems cannot be measured. Furthermore, there are no agreed, or standardized methods by which the scores of different indicators may be added together to arrive at aggregate scores that provide an overall picture of a farm, or industry's, sustainability status.

Despite these limitations a plethora of sustainability assessment systems have emerged generated by governments, industries, and non-governmental organisations, that aim to provide certainty and assurance to either consumers, or the public, that particular farming activities are sustainable. This attempt to measure and communicate sustainability attributes is undoubtedly positive given that it has generated improved awareness of environmental and social issues while facilitating the development of sustainable practices across agrifood organisations and businesses. However, there

cognitive orientation has proved so successful over the past centuries that it has become widely viewed as fact (Davies and Gribbin 1992). Rather than understood as an imperfect but useful model, the mechanistic worldview is often believed to be the literal description of nature – that is the physical and biological, individual and systemic. As Nicol (quoted in Selby 2007, 165 – emphasis in original) states, "*we have no metaphysical assumptions*" because we assume "we are more means ‘to point out’ or ‘one who points out’, originally referring to the human action of using a finger/arm to ‘indicate’ something (Jolland 2006). Long used in English, in the mid-nineteenth century it began to be used to describe machine instrumentation. Consequently, the representative capacity of the term has been degraded because it has become ‘mechanized’, it is no longer a finger pointing but a dial. And because of the accuracy with which a dial can represent a part of a mechanical system, the signifying nature of the term ‘indicator’ has been reduced. While a finger points vaguely, a dial points ‘accurately’. In the final *coup de grâce* the etymological trajectory of the term has seen it applied to socioecological systems but with the original biological vagueness removed.

Bell and Morse (2008, 41) question the capacity of SIs “to encapsulate complex and diverse processes in a relatively few simple measures”. Further, they go on to say “[s]implifying system complexity into single values that allow for easy comparison has a definite appeal”, but these values simply be guesses collected from experts… Even when there is empirical data for policy problems, it is not really amenable to treatment by traditional statistical techniques" (Funtowicz and Ravetz 1993, 743). There is an 'aura around numbers' that gives them a false exactitude, impeding rather than improving insight because they misrepresent their degree of accuracy (Strathern 2000). Use of solely numerical indicators compounds the above accuracy issue because it conflates a range of different types and kinds of indicators such that, conceptually, SIs project a false fidelity.

3.2 Machinelike parts – Indicator measurement

The next, related, issue is that it is difficult to identify or know all of the 'parts' – where 'part' refers to the individual human and natural components of a specified socioecological system – in a socioecological system, yet analogizing them as machines logically demands that each 'part' not only be identified, but the function of each discerned and, in turn, the interactions between each part completely understood and accurately measured. Measuring the functions of individual parts demands a degree of insight into how they work together, otherwise each part cannot be fully understood. However, the near limitless number of 'parts' within socioecological systems, their manifold interactions in complex causal chains, and their emergent properties means that there are many aspects that are simply unknowable and, consequently, unmeasurable (Stirling 1999). McCool and Stankey (2004, 297) explain that "[h]uman–environmental systems tend to be loosely coupled, characterized by temporal and spatial delays, nonlinear dynamics, and cause–effect relationships dominated by stochastic processes". Separating the system into components that indicators measure means that SIs will not be able to capture the relationships between these components. This is problematic as the "primacy of the whole suggests that relationships are, in a genuine sense, more fundamental than things, and the wholes are primordial to parts. We do not have to create interrelatedness. The world is already interrelated" (Senget al quoted in Bell and Morse 2008, 111). Measuring every 'part' is likely impossible, yet it is a prerequisite that SIs can perform this task and understand how every part interacts.

Not only is it likely impossible to measure all the components or their interactions but, as Gallopín (1996, 109) notes, "sometimes those interactions dominate the total behavior of the system, above and beyond the behavior of the component elements". This emergent nature of socioecological systems means they do not function according to predetermined goals and yet the ability to know where the system will 'be' at any point in time is critical to accurate measurement. Gasparatos et al. (2009, 248) explain that "emergent complex systems… cannot in most cases be fully explained mechanistically and functionally as ordinarily complex systems because at least some of their elements possess individuality, a degree of intentionality, consciousness and morality amongst others". However, the 'measurement' of these systems is generally portrayed in a manner that obscures these issues, breaking the complex, interrelated whole into components that are able to be measured while ignoring those that cannot be measured and not taking into account the way these components effect each other, or the emergent aspects of the system (Stirling 1999).

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technique, upon reductionism, upon explaining all natural phenomenon in mechanistic terms, [and] the quantification of as much of the natural world as possible" (Drengson 1995, 83).

Second is that it is impossible to both democratically and consistently rank values in a plural society, "there can be no uniquely 'rational' way to resolve contradictory perspectives or conflicts of interest over incommensurable issues in a plural society" (Stirling 1999, 120). This is known as Arrow's impossibility theorem, which Sen (2004, 69) describes as "a result of breathtaking elegance and power", explaining that in any plural grouping any ranking of values would "have to be, it seemed, inevitably arbitrary or unremediably despotic". In other words, while participatory approaches are able to extrapolate a set of values that can guide sustainability initiatives any attempt to rank these values by a plural group is not just difficult in practice but impossible in principle (Stirling 1999). The plurality of the group means that there will always be either compromise or despotism.

Finally, as Reed (2008, 2422-2423) has noted in his wide-ranging critique of participatory approaches; generally these approaches only involve stakeholders in the "implementation phase

It is proposed that indicator development needs to be conducted with ‘radical transparency’. “Simply put,” as Rawlins (2009, 73) writes, “transparency is the opposite of secrecy”, with secrecy involving ‘hiding something by action, practice or policy’. While this implies a deliberateness, ‘opacity’ does not need to be intentional. As the above analysis shows, the opaque nature of SIs comes largely from the implicit assumptions of the mechanistic worldview rather than an attempt to misinform. Still, the outcome is that SIs ‘hide’, they are not transparent. Generally three types of ‘transparency’ are identified in the literature: participatory transparency – providing stakeholders with information that suits their needs by involving them; information transparency – providing stakeholders with information that is accurate, useful, and substantial; and, accountability transparency – providing stakeholders with information that is neutral, objective, and balanced (Potts et al. 2010; Rawlins 2009). These serve as a useful guide for now, but will be dealt with more directly once we have outlined our four, relatively proximate measures that we believe will increase SIs transparency: make transparent the purpose, focus, and locus sustainability, make transparent the processes that underpin the development and aggregation of indicators, make transparent the experts and expertise involved in the development and aggregation of indicators, and make transparent the failings of indicators. Each of these will be illustrated with an example from the process used during the development of Kohuratia – the sustainability assessment and reporting system developed with Ngāi Tahu Farming. However, given our thinking regarding radical transparency was formed and refined during the development of the Kohuratia indicator suite the examples should be viewed as preliminary sketches rather than prescribed solutions.

5.2 Four forms of transparency

The dominance of the technocratic approach means that the vital sustainability questions of ‘why’, ‘how’, and ‘what’ are often ignored or obscured in favour of the technical focus. However, rather than being implicit, and, consequently, often ignored, the purpose, focus, and locus of ‘sustainability’ must be made concrete at the outset so that it can guide the development process. We would argue that value judgements are impossible to avoid during the development of SIs, so the best aim is to make those that are made public amongst stakeholders and actively discussed and debated. This *values-oriented* transparency ensures the moral impetus underpinning specific value judgements can be conscientized, enabling reflexivity, refinement, discussion, debate, selection, and synthesis amongst stakeholders.

Gaining values-oriented transparency was relatively straight-forward. Ngāi Tahu, like other Māori tribes, has the legislated right and responsibility to engage in resource management issues in New

Zealand and have, consequently, developed numerous management plans. Within these plans Ngāi Tahu have made their cultural values concerning sustainable land use explicit. In the first stage of developing the Kohuratia indicator suite content analysis of all Ngāi Tahu resource management documentation was undertaken to identify key values, their definitions, and frequency of use. Following this process kaumatua (elders) and kaihautu (tribal leaders) were interviewed and surveyed to validate the importance of each value (see Reid et al. 2013 for some of this work). The process allowed the identified values to be rapidly validated in terms of their prominence and importance. The final suite of values included:

Tino rangatiratanga – the value of independence and self-governance;

Manaakitanga – the value of supporting and caring for others to maintain personal and group dignity;

Kaitiakitanga – the value and obligation of maintaining the health and wellbeing of non-human communities;

Whai rawa – the value of building inter-generational wealth.

The desire to measure a diverse set of socioecological phenomena and the demand for simple sets of numerical sustainability indices to streamline technocratic decision-making (or rather the justification of those decisions to the non-expert stakeholders) results in the use of various processes and statistical methods for selecting, measuring, and then statistically aggregating SIs. Such varied means of measurement and the simplified aggregated indices are inevitably unable to accurately and consistently represent either the diverse phenomena measured or the complexity of the systems as a whole. Instead, they reflect the weightings, value-judgements and worldview of those designing the SIs, as well as the more pragmatic reality of using existing tools rather than developing new ones. To ensure the limitations and weaknesses that underpin SIs development and aggregation are exposed the selection, measuring, and weighting processes and methods also need to be made explicit and open for critical examination, ensuring *genuinely informative* transparency.

To ensure the dashboard was built on genuinely informative transparency involved several key components. First, the team identified indicators that would allow the performance of Ngāi Tahu Farms to be measured against the values identified through the process described above. A review of different national and international farm sustainability assessment schemes and indigenous re(c) -3 6 (b) s (i) 9 es (g(o) -10 (u6n) -10] T-10] T T T T T T T T T T T T T T T T T T T T T T T T T T T T T (indigenous governance) indicators were found for measuring the capacity for, and realization of, self-

While there are risks that come with expert-led SIs development it is also critical to have expert involvement. However, this needs to be a more comprehensive set of expertise than the 'technocratic conception of expertise' which is generally limited to very specific forms of scientific knowledge. Furthermore, often 'expertise' lacks transparency in terms of what type of expertise they have (Forsyth 2011). This is partly due to this technocratic conception, in a form of circular logic the holders of the relevant scientific, technical knowledge are implicitly accepted as experts in a technocracy because of their affinity with the mechanistic worldview. However, as Forsyth (2011, 321-322) explains, "the role of expertise is both contested and highly changing… [e]xpertise is fluid in content, membership, and in terms of public legitimacy… [therefore m]aking the content, membership and legitimacy of expertise more transparent… is the way ahead". Thus, a third form of transparency is for the types of expertise engaged in development to be made public, as well as the limitations of those types of expertise, delivering *knowledge domain* transparency.

As outlined above the process used in developing Kohuratia involved three types of experts: kaumatua, or cultural experts, kaihautu, or organizational leadership experts, and the research team - which was responsible for the identification of appropriate indicators. Each of these experts fed into the indicator selection process to arrive at an expert-identified set. Furthermore, limitations and ‘gaps’ explicit will help reinforce the necessity of qualitative indicators. Using a mixture of quantitative and qualitative indicators would provide *relatively objective* transparency.

Relatively objective transparency was achieved during the Kohuratia development process by first identifying and removing any indicators that were demonstrably shown to be scientifically invalid, or implausible to any of the stakeholders involved in the development process. This left room for the existence of indicators that cannot be scientifically invalidated yet are important for capturing

to the ultimate aim of these indicators. There is a real danger, we believe, in presenting and representing the world mechanistically both in the way this delineates the environmental problems the world faces and, consequently, the way it proscribes the types of possible solutions, and those

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