A call for empirically based guidelines for building trust among stakeholders in environmental sustainability projects

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"The scientific community must rapidly reorganize to focus on global sustainability solutions. We must develop a new strategy for creating and rapidly translating knowledge into action, which will form part of a new contract between science and society" (UN State of the Planet Declaration)

Sustainability challenges present a significant threat to humanity. Often described as wicked problems, they are large in scale, complex, difficult to predict, and plagued by political, social, environmental and administrative uncertainty. As highlighted through the quote above, successfully responding to these challenges requires knowledge, action and coordination, and thus depends on understanding complex socio-ecological systems and processes as much as on efficient and effective two way knowledge exchange among scientists, decision-makers and stakeholders. This leads to the questions: how can the science community best allocate limited funds between producing new scientific knowledge and mobilising that knowledge into action, and can this trade-off be evidence-based?

An expansive body of literature argues that effective knowledge exchange among scientific 'producers' and 'users' is underpinned by trust (e.g.- Pielke, 2007; Longstaff and Yang, 2008; Fischer, 2013; Cvitanovic et al 2014). Building trust takes time and requires dedicated effort and resourcing by both scientists and decision-makers. As an example, in a recent study aimed at assessing the environmental and economic sustainability of a coral reef system in Australia, it was estimated that 43% of the total resources were allocated to stakeholder engagement activities, with the intention of building trust to promote the uptake of new scientific evidence into decision-making processes (Fulton et al., 2013), as captured graphically in Figure 1. The allocation of resources in this manner, however, reduced the overall resources that were available for scientific activities in the project, limiting the amount of new knowledge that could be generated about the system. It is thus reasonable to ask, first, what proportion of effort should ideally be allocated to trust-building and stakeholder engagement in relation to other activities. Once this is determined, the second question is which trust-building initiatives, among the many available (reviewed by Cvitanovic et al., 2015), should take priority. In other words, is it possible to provide scientists and practitioners with some guidelines on how to best plan engagement and trust-building initiatives alongside overall project planning?

Finding empirical evidence which may guide the planning of a trust-building initiative is a difficult exercise. From our practical experience and reading of the literature, despite recognition of its importance, trust is rarely measured in environmental sustainability projects as a goal of itself and even more rarely is this done before, during and after a project. As a result, it is difficult to objectively evaluate its contribution to project success or impact. In the literature, it is frequently assumed that trust and engagement are a welcome by-product of the main research activities if effective outcomes are achieved (as discussed by Roberts & Lacey 2008). The opposite is often also assumed to be true (*'Engagement failed; it shows that the team did not build trust'*). In other words, often trust is 'deduced' from the outcome of the project itself, with no actual measurement of trust. But this is

tautological and as such uninformative. In cases of unsuccessful stakeholder engagement, for example, this tautology prevents us from assessing which stage of the trust-building process failed, whether scientists' communication and effort was deficient (as is often assumed) or whether other factors prevented stakeholders from engaging meaningfully. As a clear example, Smith et al., (2013) discuss a situation in which a high level of trust led stakeholders to *disengage* from a NRM issue. Clearly, the relation between trust and successful stakeholder engagement is not one-to-one.

Indeed, there are several difficulties in measuring and valuing trust; i) the difficulty in defining trust, ii) the challenge of finding measurable aspects of trust and a shared framework to analyse them, especially given the multiple uncertainties and complexities involved, iii) the paucity of data and iv) the logical inconsistencies in the assessment of trust discussed in the previous paragraph. We believe that a careful re-examination of the issue and establishment of some consistency in methods and procedures would benefit the long term efficacy of sustainability initiatives.

Table 1. Glossary of terms used in this paper.

Engagement: The process by which scientists involve stakeholders in their research. This can occur either directly (e.g.- via participatory research approaches (Reed, 2008)) or indirectly via the use of an intermediary (Guston, 2001; Michaels, 2009)).
Trust: Tens of definition can be found in the literature (see main text). An oft cited definition is provided by (Stern and Coleman, 2015): A psychological state in which an individual (the trustor) accepts some form of vulnerability based upon positive expectations of the intentions or behaviour of another individual (the trustee), despite inherent uncertainties or potential biases in that expectation (p118-119).
Reflection: Reflection, or critical reflection, uses processes of critical thinking to examine personal values, ideas and actions and the logic on which they are based. It uses probing questions to interrogate the rationale of decisions and examine possible alternatives. As described in (Kunseler et al., 2015): *"Once practitioners notice that they actively construct the reality of their practice they become aware of the variety of perspectives available to them"* (page 10). Practices of reflection are common in education and originally based on theorists such as (Dewey, 1933).
Adaptive management: A structured, iterative process of decision-making that aims to reduce uncertainty over time via system monitoring and the incorporation of emergent knowledge into decision-making process. As such adaptive management involves the capacity to 1) understand environmental change, 2) use this information to inform decision making, 3) act on decisions in a manner that sustains the resistance and resilience of desirable ecosystem states and 4) review and adapt decisions as new information becomes available.

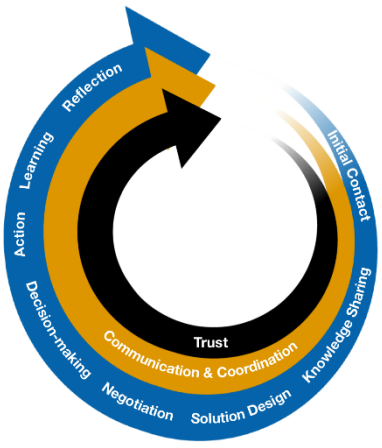

Figure 1. Schematic diagram showing the conjoined cycles of project engagement and execution (in blue), communication and collaboration (in orange) and trust building (in black). In all cases these can grow through time or build on past interactions. The blue project cycle highlights some of the key steps undertaken, such as knowledge sharing, co-design of potential solutions (or options), concluding with learning and reflection (which is key in adaptive cycles but is often neglected).

For example, trust is such as important issue for sustainability challenges because of the frequent need to balance complex political, economic, institutional and personal power relations (Dryzek, 1997; Inayatullah, 2004). These may act at spatial and temporal scales broader than a specific issue at hand (Metcalf et al., 2015). Stakeholder engagement offers a way to counterbalance these forces and scales by incorporating local interests and ensuring that traditional knowledge, needs and values are acknowledged, recognised and protected (Sherman and Ford, 2014). Furthermore, each source of power comes with different types of knowledge which can be perceived as supporting specific interests (Brugnach et al., 2008; Fiske and Dupree, 2014). Different aspects of trust, such as credibility, salience and legitimacy (Cash et al., 2002) determine whether these sources of knowledge are accepted and thus affect knowledge exchange in the decision making process (Lacey et al., 2015).

Currently, researchers and practitioners wishing to assess the role played by the many facets of trust on sustainability initiatives via methodological approaches grounded with empirical evidence will find little clarity. At the measurement level, a number of methods are in use, each with its own advantages and limitations (Table 2). At a conceptual level, however, definitions of trust count in the tens and come from different disciplines (e.g. Blomqvist, 1997; Castaldo et al., 2010; Lucas et al., 2015), different authors propose different dimensions for the construct and all of these are context dependent (Cash et al., 2002; Fiske and Dupree, 2014; Hofstede et al., 2010; Stern and Coleman, 2015). As a construct, trust pertains to all levels - the individual, institutional, social and cultural (Blomqvist, 1997). Controversially, some argue that trust is not necessary for cooperation and could even be counterproductive (Cook et al., 2005; Hardin, 2002). Although rarely addressed in the literature, it is likely that trust-building differs between collaborative vs competitive vs adversarial settings. These observations suggest that a comprehensive theoretical analysis of trust as a psychological, cognitive and affective construct may be beyond the reach of the environmental sustainability community.

Similarly, at a practical level, suitable institutions can help trust building by allowing a trustor to place trust in both the institution and the trustee (Cash et al., 2003; Memmo et al., 2003; Stern and Coleman, 2015), but institutions may also 'crowd out' spontaneous trust-building initiatives which may lead to stronger and longer lasting relations (Blomqvist, 1997; Bowles, 2008; Fulmer and Gelfand, 2012). Acknowledging uncertainty is likely to increase trust in the scientist (Cvitanovic et al., 2014; Fiske and Dupree, 2014; Lacey et al., 2015) but may reduce trust in the science, as the climate change debate clearly shows (Oreskes, 2004). Impartiality and non-advocacy strengthen trustworthiness (Fiske and Dupree, 2014), but in the climate change debate scientists have often being encouraged to step outside their academic enclosure and add their personal voice (Gibbons, 1999; Guston, 2000; Lubchenco, 1998). Competency may increase trust but may result in the scientist appearing cold and unfriendly and thus less likeable (Fiske and Dupree, 2014). Rarely discussed, in controversial issues within an adversary context, in which both scientists and other parties try to build trust, stakeholders may need to decide not only whether to trust scientists but also whether to trust them more or less than other parties.

Table 2. Existing methods for measuring trust, their advantages and limitations.

Method	**Limitations**	**Advantages**	**Example references**
Surveys/questionnaires via Lickert scales	Subjective interpretations of questions, provides limited insight i.e. detailed responses not possible.	Large data sets – generalizable results.	(Batt, 2003; Fischer, 2013; Mukherjee and Nath, 2007; Small et al., 2015; Young et al., 2016)
Social network analysis	Often based on self-reported data. Informal networks can be difficult to define.	Multiple party interactions are captured.	(Dowd et al., 2014; House et al., 2008; Oreszczyn et al., 2010);

Informal feedback	Partial data.	Quick and often easy to respond to.	(Fleming et al., 2015)
Focus groups/Interviews	Not generalizable.	Context specific findings, rich data and interpretations. May be compared to similar studies.	(Arnott et al., 2007; Canning and Hanmer-Lloyd, 2007; Carolan, 2006; Fritz and Canavari, 2008; Sutherland et al., 2013; Young et al., 2016)
Reflection and foresighting	Time required – often occurs in hindsight.	Easy, cheaply applied and often highly effective in real change at individual scale.	(Kunseler et al., 2015; Neef and Neubert, 2011)

In our opinion, there is a need to collect and share empirical evidence to assess both the *effectiveness* and the *conditioning* for trust building actions for which the literature is particularly ambiguous. This could be achieved via the evaluation of previous research programs that have focused on stakeholder engagement and relationship building (Reed, 2008) to identify the key processes and core capacities that are required to support and facilitate trust building processes. In this regard core capacities should include the individual, organisation, social, political, material, technical, practical and financial components that underpin trust building activities (Eade, 2007). This task is going to be difficult because of the very contextual and conditional nature of trust. However, it must be possible or else how would we have ever come to believe that trust is essential to environmental sustainability in the first place? We are optimistic. What we think is needed are some guidelines on how to best balance trust-building, stakeholder engagement and other project needs or, in other words, how to efficiently use one of the scarcest resources around: funds for Sustainability and Natural Resource Management.

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