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Systems of Access: A Multidisciplinary Strategy for Assessing the Social Dimensions of Sustainability

Christopher Wolsko
Oregon State University - Cascades Campus

Elizabeth Marino
Oregon State University - Cascades Campus

Thomas J. Doherty

Steve Fisher

Amanda S. Green
Davidson College

See next page for additional authors

Authors
Christopher Wolsko, Elizabeth Marino, Thomas J. Doherty, Steve Fisher, Amanda S. Green, Briana Goodwin, Ryan Reese, and Andrea Wirth

ARTICLE

Systems of access: A multidisciplinary strategy for assessing the social dimensions of sustainability

Christopher Wolsko[1], Elizabeth Marino[1], Thomas Joseph Doherty[2], Steve Fisher[3], Amanda S. Green[4], Briana Goodwin[5], Ryan Reese[1], & Andrea Wirth[6]

[1] Graduate and Research Center, Oregon State University–Cascades, 650 SW Columbia Street, Bend, OR 97702 USA (email: chris.wolsko@osucascades.edu; elizabeth.marino@osucascades.edu; ryan.reese@osucascades.edu)
[2] PO Box 3174, Portland, OR 97212 USA (email: thomas@selfsustain.com)
[3] 886 53rd Street, Unit E, Oakland, CA 94608 USA (email: stevelfisher@gmail.com)
[4] Environmental Studies Department, Davidson College, Davidson, NC 28035 USA (email: amagreen@gmail.com)
[5] Strand Agriculture Hall, Oregon State University, Corvallis, OR 97331 USA (email: briana.goodwin@oregonstate.edu)
[6] UNLV Libraries, University of Nevada–Las Vegas, 4505 Maryland Parkway, Mailstop 7012, Las Vegas, NV 89154 USA (email: andrea.wirth@unlv.edu)

The concept of access to natural resources has been a specific concern of economists and ecologists and is a distinct component in recent models of social sustainability. Using a series of conceptual and empirical examples, this article extends the notion of access broadly to social institutions and sociocultural norms. We argue that access may be usefully construed as an analytic tool that has direct applicability to many sustainability issues as it allows for cross-disciplinary and public engagement. Here the concept of access, linked to Amartya Sen's theory of capabilities, also makes visible the multi-scaled and interconnected social processes that influence the material world and from which certain individuals and communities are excluded. This article examines access as a set of culturally appropriate and equitable engagements that promote social sustainability with a series of four examples: access to actions necessary to reclaim a polluted river; access to restorative natural environments; access to information and research findings; and access to decision-making processes. Insights from these examples are integrated within the wider discourse on sustainability.

KEYWORDS: social sustainability; access; power; sociocultural norms; equity; public discourse

Introduction

When scholars from a variety of disciplines gather to discuss the social dimensions of sustainability they inevitably encounter challenges finding relatable concepts, terminology, scope, and methods of assessment. Depending on the vantage point of the discipline and the individual researcher, social sustainability can be conceived of as the health and well-being of an individual psyche (psychology), the individual attainment of basic needs (economics, engineering), the well-being of the self within a healthy social context (public health), the well-being and health of a cultural group or community (anthropology), or the larger social system itself as robust and long-lasting (sociology, economics), among others. This article is an explicit attempt of a diverse group of social scientists to identify similarities in theoretical and empirical approaches to social sustainability with the goal of improving the clarity of cross-disciplinary and public discourses.

Comparing research across our disciplines, one concept emerged, around which multiple disciplinary methods of assessment remained coherent and legible. That notion is the idea of "access." Across disciplines, we find that access acts as a common theme of engagement within which multi-scaled systems of inquiry can evolve, and around which compounding systems of inequity and unsustainability can be discussed. For the purposes of this article, we define access as the ability to influence processes and lay claim to resources that create, alter, or maintain social systems (including social institutions and sociocultural norms) across scales.

Access has been previously used as a starting point to critically analyze social systems and complex problems, and with great success. It has been more than thirty years since Amartya Sen (1981) identified "famine" not as the absolute lack of food available in a given community or

geographical space, but as the "result of [one's] inability to establish entitlement to enough food." From this premise, Sen reconceptualized ideas of poverty, famine, and even drought as the "lack of access" to the resources necessary to sustain oneself and one's quality of life. In other words, those entitled to food did not die of starvation and malnutrition, even under conditions of insufficient water and the deterioration of crops. Conversely, those without entitlements to food—entitlements enacted and maintained through social and economic systems—did die of starvation and malnutrition.

Furthering the argument, Sen insisted that the entitlements framework is not necessarily about entitlement/access to objects (food) or income (wealth), but rather that it exists to point out a prerogative to capabilities, decisions, and actions that realistically allow one to achieve goals. Who has the capability to earn a livable wage? Who has the capability to work enough hours, at a high enough salary, to provide food for one's family during times of drought? Who is ultimately free to pursue that which has value (Sen, 2001, 2005)?

Sen's observations corroborated research from 1980s disaster literature that even extreme natural disasters are experienced as such because of the social constructions of vulnerability that take place prior to and during a hazardous event (see Hewitt, 1983; Oliver-Smith, 1996, for reviews). In this conceptualization, hazardous events are not threatening in and of themselves, but are made dangerous when they come into contact with vulnerable communities. Disasters, therefore, are social constructions created by flows of power, lack of access to systems of protection, and political marginalization over time, which can result in significant harm to vulnerable communities (Oliver-Smith, 1996; Oliver-Smith & Hoffman, 2002; Cutter et al. 2003).

Both of these literatures articulate the processes that render human injustice in some communities while sparing others. Sen's (2005) argument largely applies on the individual scale, or in reference to the capabilities of people based on personal differences, while the disaster literature is widely used to assess community- and city-scale vulnerabilities and sociocultural trends that underpin disaster outcomes (Cutter et al. 2003, 2010). This article encompasses both of these research traditions, but expands the notion of access to the sustainability literature and broadens the concept of access to point out the complex, intersecting, and multi-scaled flows of power, decision-making, and other social systems, processes, and cultural norms that carve out vulnerable geographies, vulnerable communities, and vulnerable individuals. We argue that it is the sum of these limits to access that ultimately inhibits social sustainability.

In the remainder of this article, we show that the concept of access has wide applicability to a range of issues falling under the rubric of the social dimensions of sustainability. While access to natural resources has been a specific concern of economists and ecologists (Hardin, 1968; Berkes et al. 1989; Ostrom, 1999; Ostrom, et al. 2002) and has been discussed as a distinct component of recent models of social sustainability (Cuthill, 2009; Dempsey et al. 2011; Vavik & Keitsch, 2010), here we extend the concept broadly, arguing that access is a far-reaching analytic tool with direct applicability to many sustainability issues.

To best articulate our arguments, we start with a poignant example of the sociocultural construction of vulnerability due to obstacles to access in the community of El Salto, Mexico. Second, we apply our conceptualization to better understand how culturally appropriate access to green spaces is a form of equitably distributed health benefits. Third, we assess the state of access to information as an investigation into the culture of information and research, conceptualizing "open access" in information and research as an emerging embodiment of social sustainability. Finally, we look at the development of a wave-energy test site to understand access to decision-making processes as contestations among individuals, communities, and stakeholders. We chose the examples listed above because they illustrate how access interacts substantially with the social dimensions of sustainability and because they highlight the wide applicability of the concept across geographic spaces, social circumstances, and research disciplines. We conclude with a discussion of how the concept of access can make visible the multi-layered obstacles to social sustainability that exist across scales and can act as a common

language for researchers to speak to one another and engage the public.

Un Salto de Vida

The Santiago River runs through the community of El Salto in the Mexican state of Jalisco. Its toxicity level is unknown, but it is generally accepted by local residents that the river is *intocable*, or untouchable. On January 25, 2008, Miguel Àngel Lopez Rocha, a young school boy, fell from the banks of a canal close to its confluence with the Santiago River while playing with friends and was submerged in river water. Rocha was quickly retrieved, but allegedly died eighteen days later of arsenic poisoning.[1]

Community activists of El Salto, best exemplified by 24-year old Atawalpa Sophia, protested in the wake of Rocha's death for changes to the way industries in the Guadalajara region near El Salto handle environmental waste. Sophia wants the river cleaned of the contaminates that are locally believed to cause cancer and other sickness, but considerations about how to detoxify the river lead to a rabbit hole of social, economic, political, environmental, and legal obstacles. This example provides us with a profound illustration of a "wicked" problem, marked by the social and situational complexities that lead to an entanglement of power, inequity, neoliberalism, and environmental degradation that define many of the world's greatest challenges (Rittel & Webber, 1973; Blanco, 1994; Head, 2008; McCall & Skrtic, 2009). Here, the industrial corridor that lines the Santiago River has grown substantially in and around Guadalajara since implementation of the North American Free Trade Agreement (NAFTA) in 1994. Environmental protection is mandated, yet while it is generally accepted that the river acts as a waste dump for industry, between 2005 and 2011 no fines were imposed on any of the more than 300 industrial facilities in the region for being out of compliance. Protests from community members themselves, aligned under the name *Un Salto de Vida*, went completely unheard north of the Mexican border, where a majority of the manufacturing firms that line the river are based. This news story, in fact, is in the process of being broken to an American public as we write (Fisher & Jaacks, 2015), decades after the contamination began and seven years after Miguel Rocha died of exposure to toxic levels of arsenic.

The social dimensions of sustainability encompass the social, political, and cultural infrastructure that must be in place to both prevent and mitigate "wicked" problems. Where, then, can we locate the systemic cracks in institutional and other social processes that enact sociocultural and political obstacles to community-driven desires for change? As stated earlier, we think the lens of access is a useful way to frame this and other sustainability issues.

In the case of El Salto, Sophia lacks access to the large-scale political power that has enabled Guadalajara to become a friendly locale for American firms. Sophia and her community also lack access to the justice system, meant to enforce the environmental regulations that do exist. They lack access to research and biomedical information that could substantiate their claims about the disastrous health effects of the river, to a source of uncontaminated water for drinking and irrigation, and to a safe, natural place for recreation and communal gathering. In the wake of environmental abuses, the community lacks access to broad public attention and media exposure. Finally, the community also lacks access to defining the sociocultural norms of decision-makers which currently underlie neoliberal economic assumptions about what is best for the region. Sophia does, however, have access to her community and the relationships of solidarity that she has created within it. Finally, she has access to journalist Steve Fisher, which enables the beginning of a conversation about the ecological and social sustainability of the Santiago River, and provides potential links to the world of decision-makers outside of her community.

Access to Restorative Natural Environments

In El Salto, individuals suffering from pollution and poor health embody the

[1] This determination is premised on research by co-author Steve Fisher.

community's inability to access change through formal institutions; however, the inability to access and alter sociocultural norms that underpin economic models of growth and urbanization is equally in play. In the field of ecopsychology, furthermore, many scholars argue that the cultural norms of neoliberalism and the imperative for economic growth not only compromise the health of ecological systems, but also undermine the health of human communities (Ryan et al. 2007; Kasser, 2009). This may occur through a variety of mechanisms. Perhaps most centrally, individuals who have higher materialistic value orientations, or who place a higher priority on financial success, not only engage in an array of less friendly environmental behaviors (Sheldon & McGregor, 2000; Brown & Kasser, 2005), but also experience a range of negative psychosocial consequences, including having shorter, more conflictual interpersonal relationships, engaging in fewer prosocial and more antisocial activities (for a review, see Kanner et al. 2007), and display lower levels of psychological well-being (Dittmar et al. 2014). Additionally, the highlighting of financial success, image, status, and fame in advertisements has been shown to harm viewers' self-esteem (e.g., Kasser, 2005).

Heightened consumer behavior, increased immersion in mass media, and reduced time spent in nature also tend to mutually reinforce one another. For example, individuals in the United States and Japan spend a shrinking percentage of time engaging in, and enjoying the documented health benefits of, nature-based recreation (Pergams & Zaradi, 2008). In conjunction with this trend, individuals devote an increasingly large percentage of time to electronic media indoors: the average adult in the United States devotes approximately five hours per day to watching television, and an additional 2.5 hours on non-work related viewing of smartphones, tablets, personal computers, and other screen devices (often using more than one device simultaneously) (Nielsen, 2014). The sedentary nature of such viewing greatly harms health and leads to premature mortality (Owen et al. 2010). In familial contexts, greater television usage also predicts an increase in children's levels of consumer behavior, which then contributes to poorer relationship quality with parents (Schor, 2004).

In the context of widespread urbanization, consumerism, and indoor immersion in electronic media—of reduced access to natural environments—it is not coincidental that we now see a robust emerging literature demonstrating extensive mental, behavioral, and physical health benefits of exposure to natural environments. "Exposure to natural environments" or "exposure to green spaces" has been operationalized in numerous ways, including having designated parks in one's neighborhood (Mitchell & Popham, 2007), having plants and other natural features in and around the house (Wells & Evans, 2003), gardening or participating in horticultural programs (Wichrowski et al. 2005), viewing nature through windows or in photos (Ulrich, 1984; Berman et al. 2008), experiencing higher levels of biological diversity in local parks (Fuller et al. 2007), and walking outdoors (Hartig et al. 2003).

The empirical health benefits of exposure to nature are extensive, including increased capacity for directed attention and reduced mental fatigue (Tennessen & Cimprich, 1995; Kaplan, 2001), improvements in cognitive functioning for individuals with attention deficits (Cimprich & Ronis, 2003; Taylor & Kuo, 2009), increased positive emotional experiences (Fuller, et al. 2007; Van Herzele & de Vries, 2012), reduced anxiety and depression (Gonzalez et al. 2009), reduced stress along with stress-related illness (Leather et al. 1998; Wells & Evans, 2003; Van den Berg et al. 2010), improved recovery from surgery (Ulrich, 1984; Park & Mattson, 2009), lower disease morbidity (Maas et al. 2009), and lower mortality, including mortality related to income deprivation (Takano et al. 2002; Mitchell & Popham, 2008). In addition to directly facilitating psychological and physiological health (e.g., via stress reduction), natural environments also have indirect positive effects on health by providing attractive locations for physical activity (Kaczynski & Henderson, 2007; Hartig, 2008) and for enjoying higher quality social interaction and social support (Coley et al. 1997; Shinew et al. 2004).

Additionally, active engagement with nature has been shown to contribute to a coherent,

meaningful sense of connection with the natural world, which in turn is positively associated with a variety of mental health indices (Wolsko & Lindberg, 2013; Zelenski & Nisbet, 2014). In specific cultural contexts, the mental and physical health benefits of this existential connection with the natural environment are due to a life in nature that is not only recreationally enjoyable, but is also pragmatically imbued with rich sociocultural value, for example through the spiritual, social, economic, and physical ramifications of subsistence practices in indigenous communities (Izquierdo, 2005; Wolsko et al. 2006; Labun & Emblen, 2007).

While this literature on exposure to nature and health is encouraging, the distribution of natural spaces favors ethnically and racially privileged communities (Wolch et al. 2014). Certain ethnic minority and low socioeconomic status communities, already suffering from numerous mental, physical, and behavioral health disparities, also tend to live in neighborhoods with less access to green space and greater exposure to environmental toxins (Adler & Newman, 2002; Heynen et al. 2006). Even when access to natural spaces is available, the normatively sanctioned manner of access is frequently directed by affluent, ethnically and racially privileged voices (Kessel et al. 2009). Byrne (2012), for example, explored the perceptions of barriers of a Latino community's access to parks in Los Angeles. Many research participants reported that they felt unwelcome or out of place, and some also felt discriminated against based on their way of using a park, which favored a large gathering over quiet hiking. Byrne concluded that there appears to be a "dominant nature narrative," which he termed "white nature," that may serve as a barrier to some communities accessing parks for fear of being judged and/or discriminated against. Butler and Richardson (2015) reported similar findings in their investigation of national park use by black South Africans. In particular, many of the participants indicated feeling unwelcome and stated perceptions that they were unsure what "to do" in national parks.

While we understand the research on nature and wellness to date to be valuable, it is paramount for researchers and institutions (e.g., parks and recreation departments, urban planning commissions) to begin identifying how their own conceptualization of recreational engagement with the natural world may influence outcomes for diverse communities. Much of the literature to date focuses on access to green spaces as a means to reduce stress and facilitate the restoration of mental processes, largely through "appreciative" and often solitary recreational experiences in nature (see Wolsko & Lindberg, 2013), which might conflict with the worldviews of some communities, especially those that have been historically oppressed. Multicultural competency in environmental health-related research and policy decisions can be promoted through dialogue, consensus, and community-based participatory methods to formulate meaningful research questions and to determine relevant outcomes and policy decisions for specific communities. Thus, access issues in this case revolve not only around access to green spaces, but also on the ability of specific communities to access and alter the sociocultural norms of acceptable behavior within such places.

Access to Information

> Increased access to information and knowledge, underpinned by universal literacy, is an essential pillar of sustainable development (IFLAI, 2014).

Education is a critical component of social sustainability, alongside healthcare, housing, and food access (Cuthill, 2010). Education inherently relies on access to information, an essential component of information literacy. In fact, the International Federation of Library Associations and Institutions (2011) provides specific recommendations for governments, which stress how access to information is critical to a global society, lifelong learning, and individual well-being, stating that "Media and Information Literacy is a basic human right...and promotes greater social inclusion." Such access is essential for individuals to be information literate and, by extension, to fully participate in conversations and decisions about issues that affect their lives.

While the Internet has increased global access to information of all types, a significant portion of research-based information remains unavailable to many people. Research literature is

often reserved for those affiliated with organizations that pay for access, a model held over from a pre-Internet, print-based information society. And even though not every individual can benefit directly from research publications, the widespread communication of such work is critical for ensuring that scientists, students, politicians, stakeholders, and other engaged individuals can use the best information available.

Recent shifts in scholarly publishing are creating a more openly accessible communication system that encourages the use of research findings by non-traditional audiences (those outside academia and other research institutions). Authors, libraries, organizations, governments, and publishers are making "open access" to information a priority. Open Access (OA) in this context refers to scholarly research that is made freely available to anyone with an Internet connection and is free to use, adapt, and redistribute so long as the original "authors [retain] control over the integrity of their work and the right to be properly acknowledged and cited" (Chan et al. 2002). It should be noted that open access to *natural resources* (e.g., Schlager & Ostrom, 1992) is quite distinct from the conceptualization of open access to *information* discussed here. The genesis of OA to scholarly research derived from a number of interrelated concerns, including the consideration of information as a public good, the recognition that the current subscription-access model is unsustainable given decreasing library budgets, and authors' interest in communicating their research to both their peers and a wider audience. Even traditional publishers, while slower to embrace OA as a publishing model, are increasingly making open access an option for their authors, typically by asking authors to pay an article-processing charge either in a fully open format or a hybrid journal in which some content resides behind a paywall and some is free (e.g., Springer's Open Choice option). The number of publishers that embrace OA (only) is growing in number and, in some fields, these journals have the highest rankings (e.g., PLOS).

Researchers (used here to refer to anyone seeking access to scholarly information) have long been stymied by requests to pay for access to online journal articles. Even scholars and students at research institutions that provide subscription-based access are frequently frustrated by complicated systems that require authentication (Schonfeld, 2015). However, the barriers for access to those unaffiliated with research institutions are much higher because the only route to research literature for most is by costly payment.

The United States, the United Kingdom, Australia, South Africa, and many other countries acknowledge the inequalities in access to research and the problems associated with the subscription model. These issues are currently being addressed through policies developed by funding agencies (governmental and otherwise). For example, in the United States, the White House's Office of Science and Technology Policy (OSTP) (2013) issued a directive to federal agencies that "[s]cientific research supported by the Federal Government catalyzes innovative breakthroughs that drive our economy. The results of that research become the grist for new insights and are assets for progress in areas such as health, energy, the environment, agriculture, and national security." In other words, access to research fuels more research, creativity, innovation, and empowerment. With OA, a small business can have the same information as a large corporation, and an informed citizenry can have access to the same science covered by news media and cited by policy-makers. The OSTP directive requires agencies to develop plans to ensure that the published results and data generated by research they fund is available to everyone (typically after a brief embargo period).

Education, which is inherently dependent on accessing information, is essential to an informed and engaged society, whether it be for access to current healthcare information or to accurate climate-change research. One argument against public distribution of scholarship is that individuals without disciplinary training will not understand, and therefore be unable to benefit, from access to research literature. However, the "public" includes medical practitioners and others who can improve their practice through enhanced access (O'Keeffe et al. 2011; NIH, 2014). One example of the general demand for access is the "We the People Petition" (2012) to "[r]equire free access over the Internet to

scientific journal articles arising from taxpayer-funded research," which gathered over 65,000 signatures (at a time when only 25,000 were required for a response from the White House), underscoring that access to scholarly information is something people do indeed view as a right. Like the examples before, examining access here serves as an analytic tool to assess the ability of multiple publics to acquire a resource (in this case research and other information); *and* the ability to change the status quo—the social and economic norm of publication companies making large profits from publishing the research literature.

Access to Decision-Making Processes

Access to healthy ecosystems, restorative natural environments, and educational information can be enhanced only when engaged stakeholders are given meaningful access to decision-making processes. However, who has access, how one establishes and protects the "right" to access, and who gets counted as a "stakeholder" are often profoundly contested matters. Our final example illuminates how access becomes contested due to different claims of ownership and in terms of the degree to which one has a stake in development plans.

These access issues are examined in the context of a 2011–2012 effort by the Northwest National Marine Renewable Energy Center (NNMREC) and Oregon Sea Grant (OSG) to carry out a community-based process to choose the site for North America's first full-scale, grid-connected wave-energy test facility (called the Pacific Marine Energy Center–South Energy Test Site, or PMEC-SETS). The siting process, developed by NNMREC and OSG and independently evaluated, included stakeholder engagement along the Oregon coast and ultimately sought proposals to host the site from two communities—Reedsport and Newport.

When examining access to decision-making processes, it is essential to first identify the stakeholders in the process. Freeman defines a stakeholder as "any group or individual who can affect or is affected by the achievement of the organization's objectives" (1984). In contrast to Freeman's broad definition, Clarkson (1995) defines stakeholders as those who may be put at risk by a manager's decision. The point here is not to determine which definition is the more correct, but rather to illustrate that identifying stakeholders can be a contentious process.

In the context of the Oregon coastal regions in which we (Goodwin and colleagues) have examined access to decision-making processes, oceans formally fall under the Public Trust Doctrine, "the legal concept that the government holds the common water resource in trust for the public and regulates the commons in the public interest" (Scanlan, 2006). Under Freeman's (1984) definition, the stakeholder list for ocean management would include all citizens of the United States. Using Clarkson's (1995) definition, the stakeholder list would be more explicit. For example, commercial fishermen, who have made significant investments in their businesses, would be primary stakeholders because placing a wave-energy development in prime fishing grounds would put them at risk for declining income. Likewise, if a nearshore wave-energy facility were placed in sight of a luxury hotel, the owner could be vulnerable to losing business due to diminished views.

Considering the potential impacts of ocean-management decisions on "stakeholders" and the legal requirement to allow public comment on those decisions, an effective decision-making process has to contend with multiple challenges. One is creating reasonable access, or the capability of stakeholders to participate in decision-making processes (Sen, 2005). Another is wrestling with who among the public is considered a "stakeholder" in the first place.

With regard to the first challenge, we see that access to decision-making processes can be hindered in multiple ways. Not having access to comprehensible information can hinder a stakeholder's ability to engage in a decision-making process (Bryson et al. 2013; Dalton, 2006). Additionally, the ability to participate can be stifled when the avenues for involvement are not accessible. Specifically, relying on electronic means of input severely limits access by ethnic and racial minorities and those with lower levels of education and socioeconomic status (Mossberger et al. 2006). Furthermore, physical access to a process can be hampered by the location and timing of public deliberations (Tuler & Webler, 1999; Bryson et al. 2013). For example, holding a meeting in a place

inaccessible by public transportation is likely to limit attendance. Similarly, scheduling a meeting during a standard workday precludes stakeholders who work at that time.

Regarding the problem of delineating stakeholders, Mitchell et al. (1997) proposed a theory of stakeholder salience to explain "the degree to which managers give priority to competing stakeholder claims." Stakeholder salience is based on the stakeholder's perceived power, legitimacy, and urgency. Power is defined as "the ability...to bring about the outcomes [stakeholders] desire" (Salancik & Pfeffer, 1974), legitimacy is "a perception or assumption that the actions of an entity are desirable, proper, or appropriate" (Suchman, 1995), and urgency is "the degree to which stakeholder claims call for immediate action" (Mitchell et al. 1997). The amount or type of attention paid to a stakeholder is generally based on these attributes. Definitive stakeholders are those who possess all three attributes, and they often, but not always, receive the most consideration from managers, and are therefore most likely to gain access to decision-making processes.

Viewed through this lens of stakeholder salience, our research (Goodwin and colleagues) indicated that commercial fishermen were definitive stakeholders in the PMEC-SETS process, as they possessed power, legitimacy, and urgency. However, the priority given to the commercial fishermen marginalized other members of the local community. In interviews conducted by Goodwin and colleagues, one participant reported that commercial fishermen "put some pretty serious constraints on the locations that they'd 'allow'" and other participants were not comfortable enough to make alternative recommendations. Another participant recognized the importance of the commercial fishing industry, but said, "the fishermen do not own any ocean areas or bottom…these places are instead owned by the public and should be treated as such."

This example demonstrates that access as such is not necessarily a "good" in and of itself, but that legitimate access to decision makers and decision-making processes will be continuously contested. Investigating these processes of contestation is also a vehicle for understanding social sustainability. As in our other examples, we find that access to the sociocultural norms that underpin social processes, in this case the process of defining the term "stakeholder," is paramount.

Conclusion

As noted in the introduction, using access as an analytic tool to investigate issues of social sustainability brings to mind Sen's theory of capabilities. However, as our examples have shown, explicitly identifying whether or not an individual or group has access to governance systems, sociocultural norms, and decision-making processes extends the implications of that perspective. Sen (2005) defines capabilities as, "the opportunity to achieve valuable combinations of human functionings—what a person is able to do or be." Because the locus of his investigation is necessarily on the individual, Sen (2005) continues, "they [capabilities] fall short of telling us enough about the fairness or equity of the processes involved, or about the freedom of citizens to invoke and utilize procedures that are equitable."

In all four examples presented above, individuals and communities must do just that—to instigate change or to promote the social dimensions of sustainability they must simultaneously negotiate multiple sociocultural, political, and institutional systems or processes. In these cases, access—the ability and means to catalyze change in or maintenance of social systems, which have material and social consequence—is limited by various obstacles and in diverse ways. In the cases of access to research findings (literature) and to green space, both actual goods and/or services may be limited for certain individuals and groups, along with access to processes that may alter the sociocultural norms that prioritize, for example, the profit motives of publishers and the preferred outdoor recreational experiences of dominant cultural groups. More insidiously in the case of El Salto, norms that exclude the well-being and desires of marginalized groups pose complex obstacles to access, with serious material and social consequences.

As in the equitable management of common-pool resources, in some instances it may be in the interest of social sustainability to limit access, while in other cases social sustainability rests

directly on opening up processes of decision-making and development. Recent work by Klain et al. (2014) shows the political and cultural challenges involved in striking this balance of access in the context of marine-resource management. In the El Salto example and in the development of a wave-energy test facility, there is public debate surrounding what constitutes equitable and legitimate access to decision-making processes. The persistent discourse over "who has the most to lose" in the development of the wave-energy project remains unresolved.

Some of the examples that we have described help inform parts of others. Limits to the open access of information and research affect Atawalpa Sophia's ability to gather information that could help her community understand the biochemical makeup of the river, which in turn could be used to access public, political, and legal support. Conversely, increasing access to information and experts via the Internet provides opportunities for Sophia to meet and engage with journalists and filmmakers. While arsenic poisoning and the public health consequences of living along a polluted river have reasonably garnered the most attention from community members in El Salto, lack of access to green spaces might have longer-term consequences to mental and physical well-being that community members have yet to address.

Most helpfully, framing the issue of social sustainability around access allows us to use common language to talk about the interrelatedness of our research. The notion of access, unlike the concept of capabilities, gives us an analytic platform from which we can assess an individual's or a community's ability to evoke change in and across social, economic, and ecological systems. The term is distinct from conceptions of empowerment in that it locates the analysis and prospective changes within the systems themselves instead of in vulnerable or historically disenfranchised communities. The tool is also distinct from notions of participation, because "access" allows us to discuss both material capital and social capital using the same analytic concept. Because access can be deployed across material, social, and ecological systems and because it can assess both individual- and community-level engagement, it becomes particularly helpful for discussions of sustainability.

From a pragmatic perspective, talking about access is a way to articulate complex analyses using a simple term from the vernacular that had, and has, meaning outside of research traditions. In this case, the access concept allows for immediate engagement among researchers and has the potential to facilitate involvement outside of academic circles. We anticipate that using the common term, "access" will make it possible to discuss critical research on social sustainability with the public, and across publics in a comprehensible way while maintaining situational complexity. In other words, we can talk immediately with the public about the ability or inability of individuals and communities to access systems of power and change without having to translate academic jargon. This increase in transparent communication is in line with the focus of participatory action research on improving the accessibility of language used to convey research findings and was a specific goal of our collaborative effort (see also Kemmis & McTaggart, 2006).

Finally, using access as a mechanism for understanding sustainability also shifts focus away from goods and/or steady-state social and ecological systems and refocuses the broader sustainability discourse on processes of change (see Dillard et al. 2012). This approach is in line with current social science research across multiple topics, such as in the study of environmental migration (see Marino, 2013). The world, writ large, is in a state of flux and uncovering who has access to systems of change, and systems in stasis, is a vital social science contribution to the sustainability discourse.

Authors' Note

Co-authors Doherty, Fisher, Green, Goodwin, Reese, and Wirth are listed alphabetically, as they contributed equally to this manuscript.

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