
REVIEW ARTICLE

Rethinking Scale in the Commons by Unsettling Old Assumptions and Asking New Scale Questions

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Scale is a powerful concept, a lens that shapes how we perceive problems and solutions in common-pool resource governance. Yet, scale is often treated as a relatively stable and settled concept in commons scholarship. This paper reviews the origins and evolution of scalar thinking in commons scholarship in contrast with theories of scale in human geography and political ecology that focus on scale as a relational, power-laden process. Beginning with early writings on scale and the commons, this paper traces the emergence of an explicit scalar epistemology that orders both spatial and conceptual relationships vertically, as hierarchically nested levels. This approach to scale underpins a shared conceptualization of common-pool resource systems but inevitably illuminates certain questions and relationships while simultaneously obscuring others. Drawing on critiques of commonplace assumptions about scale from geography, we reread this dominant scalar framework for its analytic limitations and unintended effects. Drawing on examples from small-scale fisheries governance throughout, we contrast what is made visible in the commons through the standard approach to scale against an alternative, process-based approach to scale. We offer a typology of distinct dimensions and interrelated moments that produce scale in the commons coupled with new empirical and reflexive scale questions to be explored. We argue that engaging with theoretical advances on the production of scale in scholarship on the commons can generate needed attention to power and long-standing blind spots, enlivening our understanding of the dynamically scaled nature of the commons.

Keywords: scale; common-pool resources; human geography; political ecology; power; environmental governance; small-scale fisheries; SSF Guidelines; gender

Introduction

Scale is a powerful concept, offering a lens that shapes how we perceive the world and related problems and solutions to complex human-environment dilemmas in the commons. Studying how common-pool resources (CPRs) are governed inevitably entails making choices about the level of environmental and sociopolitical organization used to frame our analysis. Whether or not our various choices and related assumptions about scale are made explicit, they inflect our conclusions: notions of optimal water governance shapeshift when viewed from the perspective of a downstream village or the wider watershed; perceptions of sustainable forest use change across timescales of a decade or a generation; the stakes in fisheries management differ when framed as a local, national or regional dilemma. Consequently, even when scale appears in the background of our exploration of the commons, its outlines—taken-for-granted or merely implied—direct our focus, setting boundaries within our perceptions that distinguish what is relevant for study from what is not (Ollman, 2003).

Despite its conceptual power and ubiquitous presence, scale itself is often regarded as a self-evident and stable “thing” in many fields, with customs dictating the “optimal set standard ranges of the scale of research” (Sayre, 2005, p. 283). While commons scholars have made instrumental contributions to theorizing multi-scalar dimensions of environmental governance, in recent decades, scale itself has been treated as a relatively stable and implicit element of analysis, providing structure for the examination of other dynamics and entities of interest in the commons.

Our aim is to unsettle the concept of scale and bring it to the foreground of analyses of the commons by raising new empirical and reflexive questions about scale for scholars to engage with. The alternative scale questions we propose are rooted in a theoretical orientation to scale articulated by human geographers and political ecologists: scale is a constitutive *process* that is continuously produced, struggled over, and transformed through interactions of human and non-human actors that powerfully shape human-environment relations. To lay the groundwork for constructive engagement with a process-based and relational theory of scale with attention to power, we first sketch the development of scale theory in commons or CPR scholarship¹ that culminated in a shared conceptualization of scale as multi-level and hierarchical. Second, we contrast this approach with advances in scale theory made by geographers and political ecologists and leverage their critiques of commonplace assumptions about scale that equate it with size, level, and hierarchy, extending these insights to the study of CPRs. Lastly, we outline steps for conceptualizing and exploring scale otherwise, as a multi-dimensional process that constitutes the commons. Instead of merely asking questions about *which* scale or level we should we choose to study or proposing a singular alternative framework, we raise different 'scale questions' in need of attention: *How* do certain recognizable scales form and come to dominate CPR governance? *What* are their effects? *Who* controls the interpretation of which scales or levels are the 'right' ones for governance interventions? *Why* does interpretive control over scale matter? In addition to raising new empirical questions, we outline accompanying reflexive questions that can guide scholars to critically rethink how scale is enacted through our research on the commons. To illustrate how scale alters what we see, we weave examples from small-scale fisheries (SSF) governance throughout, contrasting what is illuminated (and often what is not) through a standard approach to scale with our own efforts to apply new scale questions to understand gendered dimensions of SSF governance in the commons.

Surveying Scale in the Commons

Scale as local and multi-level

Ostrom's research on the commons has "in no small measure" transformed the field of environmental governance studies (Clement, Harcourt, Joshi, & Sato, 2019). Although the originality and merit of her work in *Governing the Commons* would not receive full recognition until after winning the Nobel Prize in Economics in 2009, almost 20 years after its publication, her work stood in stark contrast to conventions in economics and political science at the time both in terms of her unconventional theories of collective action and her identity as a woman (Clement et al., 2019). Amidst these accolades we argue that her unconventional approach to scale is often overlooked. First, her emphasis on local-level governance was unorthodox, putting seemingly "tiny events in the sea of human endeavors" at the center of her social science analysis (Elinor Ostrom & Ostrom, 2004, p. 106). Gibson et al. (2000) outline how many political scientists at the time considered every day, local decision-making to be inconsequential—too mired in the tangles of context to be useful for the development of any generalizable theory relevant to higher-level phenomena, which were considered inherently more important. Ostrom's early work upended the scalar convention that "bigger is always better" and focused on the magnitude and inner workings of local-level collective action as a viable alternative (under certain conditions) to the inevitability of overuse or enclosure predicted by others. Second, her multi-level approach to scale was unconventional at a time when most political scientists specialized in studying actions and outcomes at specific scalar levels (e.g., regional or national) in isolation (Bridge & Perreault, 2009; C. Gibson et al., 2000) and neoclassical economists divided themselves along micro- and macro lines, deferring the challenge of integrating the "scaled nature of social phenomena across levels of economic organization" (Sayre, 2005, p. 288). While this pigeonholed scholars into specialized levels "without much attention to how the phenomena at that level is linked to phenomena at a higher or lower level" (C. Gibson et al., 2000, p. 223), Ostrom strove to understand how governance functioned both within and among levels. As a result, unravelling the dynamics that circumscribed scalar levels became a critical component of understanding multi-level governance in the commons for those intellectually linked to the Bloomington School of institutional analysis.

A shared conceptualization of scale in the commons as hierarchical and multi-level

Building from this foundation, the question of scale in the commons was confronted directly in Gibson et al.'s (2000) review of the term. In search of a cogent definition and shared scalar framework for commons scholars,

¹ Here we use the term commons or CPR scholarship interchangeably to refer to work that is centrally concerned with natural resource governance rooted in the Bloomington School of policy analysis, acknowledging that that is one direction among the diverse intellectual projects that have emerged there.

the authors surveyed how different social and natural sciences defined and applied the term. Their review found that scale is an integral concept in many disciplines but is often treated inconsistently. To foster greater legibility and consistency within the field of the commons, the authors outlined a set of shared principles or “fundamentals of scale” that they modeled after work by ecologists (e.g., Levin 1992). They defined scale as any dimension of measurement (analytic, spatial or temporal) used to measure and study phenomena composed of distinct levels or units of analysis (e.g., spatial levels, temporal time frames, or jurisdictional boundaries; Cash et al., 2006). Individual levels are treated as discrete entities but are also integrally linked and related hierarchically: Higher levels contain lower levels but are not simple combinations of attributes of smaller units; rather they can show new, collective behaviors (C. Gibson et al., 2000) (**Figure 1**).

While different approaches to scale invariably exist, a large number of papers exploring scale in the commons use Gibson et al.’s definition or refer to Cash et al. (2006) (who cite Gibson et al. and define scale similarly; Vervoort et al., 2012). Amassing over 1,200 citations (Google Scholar searched on 7/01/2020), Gibson et al.’s work sparked a proliferation of papers on scale in the commons post-2000 (e.g., Young 2002; Young 2006; Cash et al., 2006; Cumming et al., 2006). While many scholars tackled scale directly, often focusing on the relationships and entities that ‘link’ scales or levels, the concept has also been indirectly influential. For instance, scale as hierarchical and multi-level can be discerned in the structure of several popular conceptual tools and frameworks in the commons, such as the level of rules (Kiser & Ostrom, 1982), design principles (E. Ostrom, 1990), and the social-ecological systems framework (SESF; Ostrom, 2009). Widely used and applied in a variety of settings, each of these conceptual devices entail similar scalar conventions rooted in the fundamentals of scale articulated by Gibson et al. (2000)—for instance, how distinct levels of rules are conceptually ordered and related to rights, the design principle of nested enterprises in the governance of enduring CPRs, or the structure of tiered subsystems and variables in the SESF.

Human geographers and political ecologists take on scale

The scale debate in geography

Scale cross-cuts the diverse orientations and related subfields within geography, and is widely considered to be one of the discipline’s foundational concepts (Howitt, 1998). Despite its conceptual centrality, there is no singular definition or consensus on scale within the diverse field of geographic inquiry. For physical geographers, differences between cartographic scale (i.e., the relationship between the distance on a map to the corresponding distance on the ground), geographic scale (i.e., spatial extent of phenomenon studied), and operational scale (i.e., level at which a process operates; see Lam and Quattrochi 1992) are acknowledged and used relatively consistently (Marston, 2000). However, physical geographers generally treat scale as an implicit element of analyses rather than an object of inquiry (Howitt, 1998).

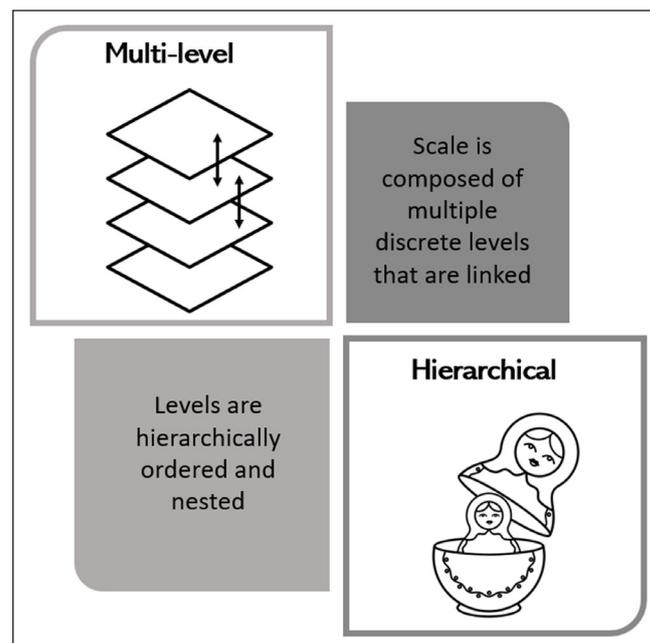


Figure 1: Gibson et al.’s (2000) influential “fundamentals of scale” for the commons propose that scale is multi-level, hierarchically related and subsequently nested. Their work borrowed heavily from foundational writings on scale by ecologists.

In contrast, some human geographers have moved beyond exclusively methodological debates about the “strengths and weaknesses of various scales” and the “right” level of analysis within (Purcell & Brown, 2005, p. 607). Beginning in the 1980s, human geographers broadened the meaning of the term and recast the importance of scale as a pillar of social theoretical reflection, treating it as an object of inquiry in its own right (Jones, 2017). Rather than a conceptual given imposed upon particular research problems, human geographers treat scale as an object of inquiry in its own right and focus on understanding the relational qualities of scale that interact with space, place, and environment to make up the geographies we inhabit and study (Leitner, Sheppard, & Sziarto, 2008). This framing calls into question the stability of scalar categories and their inherent order (e.g., household, village, state), directing attention instead to how these categories interact and are themselves produced, reproduced, and transformed (Sayre, 2009). Human geographers’ conceptualization of scale is shaped by distinct lineages of critical social theory (e.g., political economy or post-structuralism), and they generally reject notions of scale as a given or fixed category that pre-exists the social, ordering the world into discrete levels (Marston, 2000). Instead, scale is understood as a “relational, power-laden and contested construction” (Leitner et al., 2008, p. 158). This seemingly simple assertion—that scale is socially constructed—has driven human geographers to theorize and explore the processes whereby scale is made, reorganized, and transformed (Marston, 2004), asking process questions about how particular scales become constituted and reconstituted in response to socio-spatial dynamics and to what effects (Marston, 2000). Attention to power is central to this approach, as different actors seek to strategically “harness, manipulate and transform scalar relations” (MacKinnon, 2008, p. 24). These actions can construct new scales or reconfigure existing ones with implications for power relations, which is broadly referred to as the ‘politics of scale’ (Leitner et al., 2008). As such, the identification and depiction of human and non-human activities is a political process (Forsyth, 20001), where the ability to define the ‘right’ scale for interventions in resource management is “inseparable from the struggle over who should define, inform, and conduct the governance process” (Sievanen, Gruby, & Campbell, 2013).

Theoretical blind spots and revisions to scale theory

Human geographers’ attention to the socially constructed nature and power-laden implications of scale are ongoing projects marked by diversity and disagreement. Instead of a hindrance, we argue that continued debate has been intellectually productive, pushing individuals to challenge their own blind spots and assumptions about scale through dialogue. Here we highlight two moments of reckoning and revision in scale theory in geography—when blind spots on gender and ecological processes were amended, reflecting their relevance as forces shaping scale—that we think are instructive for commons scholars.

While human geographers are broadly concerned with the ways that scale is constructed through and reinforces social relations of power, historically gender and the wider system of patriarchy were overlooked in such processes (Marston, 2000; McDowell, 2001). Questions driving geographic scholarship overwhelming focused on capitalist relations of production as the driver of scaled relationships, concentrating material relations and institutional powers at certain scalar levels where they became ‘fixed’ (N. Smith, 1992). This narrow view of political economy overlooked the role of social reproduction (Marston, 2004) and likened capitalism to a natural law with boundless causal powers to organize material life (Gibson-Graham, 1996). Women were attributed little agency in this process, and domestic spaces such as the household and sites including the body were ignored as relevant levels of political organization and analysis (Marston, 2000). Feminist geographers have challenged this preoccupation with limited components of political economy, shifting boundaries between what is considered economic and non-economic activities (Cameron & Gibson-Graham, 2003) and demonstrating that scale is produced through political mobilizations of a whole range of social actors (Marston, 2000). While their contributions have often been discounted and their mobility constrained, women have certainly contributed to generating wealth (Cameron & Gibson-Graham, 2003) and have affected the construction and transformation of scale through these activities and others. Put simply, gender is a dimension of power and difference which shapes manifestations of scale that organize social, political, and economic life (Marston, 2000). These dynamics were excluded by models of the multi-level political economy that labeled these activities as ‘non-economic’ (Cameron & Gibson-Graham, 2003). Blind spots on gender relations and gendered spaces are also prevalent in commons scholarship (Clement et al., 2019), and we argue that this oversight is, in part, similarly rooted in assumptions about scale that influence perceptions of which levels of organization matter and what they contain (an assertion we explore further in the coming section).

A second advance to scale theory in geography came when the sole emphasis on “the social” in the construction of scale was extended to include the agency of non-human actors and ecological processes. This shifted the dialogue from “social construction” of scale to “social and ecological production” (Sneddon,

2003). Again the boundaries around what actors and forces were seen as relevant to the construction of scale and its political implications shifted, and scale seen as “also produced through ecological means, and never solely through social processes and discourses” (ibid, p. 2234). Political ecology is particularly instructive in its attention to the intersection of uneven social and biophysical processes in the production of scale, as this ongoing process both reflects existing power imbalances and creates new configurations of winners and losers in terms of resource access and control (Mansfield, 2005; Silver, 2008). On this point, commons scholars already share with political ecologists an interest in understanding conjoined biophysical and social dimensions of governance (in addition to overlapping intellectual roots; Robbins, 2011, Tuner, 2017). However by holding scale fixed, commons scholars have largely focused on other dynamics (such as interactions between static levels; Cash et al. 2006), overlooking how the intersection of social and biophysical forces *produce* scales and perceived levels of organization within with implications for access to and control over resources in the commons.

Deconstructing commonplace assumptions about scale

In challenging the conventional limits of scale theory within their own discipline, geographers have observed that several assumptions about scale are prevalent. Whether intentionally or unwittingly, the fluid and multidimensional nature of scale is often flattened for the purposes of simplification and abstraction, equating scale with size, bounded levels, or hierarchy (**Figure 2**). Drawing on examples from small-scale fisheries governance, we illustrate how the presence and effects of each assumption surface in the commons. Leveraging insights from geography, we deconstruct each assumption’s component parts, their effects, and status as given.

Assumption 1: Scale as size

Reducing scale to an analogue for size is a commonplace rendering of geographic scale and other relations we think of as scaled (Howitt, 1998). In the case of fisheries, scale as size is readily apparent in the very labels ‘small-scale’ and ‘large-scale fishery’ that frame governance debates and underpin discussions of the commons. While most fisheries scholars are well aware that perceptions of size are relational, as a “small-scale fishery in one location will not necessarily look similar to one elsewhere” (Charles, 2011, pp. 85–86) applying the label in practice often relies on sizing up capture technologies such as boats and fishing gear (H. Smith & Basurto, 2019). Often, the ‘smallness’ of SSF is taken to be obvious, “where you can know a small-scale fishery just by looking at it” (D. Gibson & Sumaila, 2017). Whether applied informally or inscribed in national fisheries laws and monitoring protocols, relying on the physical dimensions of boats and fishing gear to determine the “natural scale” of a fishery is widespread.

Reducing SSF to these dimensions eases observation, measurement, and management (Scott, 1998). However, when this reduction loses its identity as an analytic abstraction (i.e. a simplification, a choice of observation, a tool for communication), scale is perceived as *the things themselves*: size and scale are treated as virtually interchangeable, and therefore, small boats *are* SSFs (and vice versa). Geographers have noted that as these abstractions are repeated, they often circulate without accompanying attention to their limits, genealogies, or the “content of the concepts involved” and become naturalized scale labels rooted in sized-based objectivism (Howitt, 1998, p. 50; Tsing, 1997). In the context of fisheries, the concepts and assumptions embedded within these scale labels have been naturalized to the point of near invisibility.

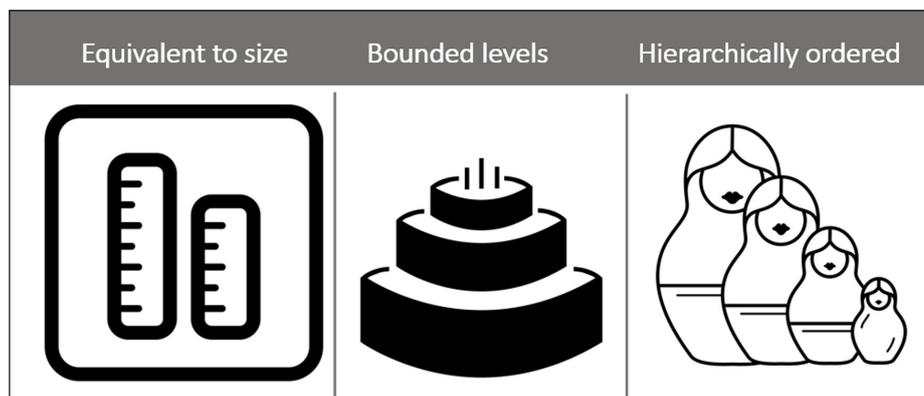


Figure 2: Underlying assumptions about scale critiqued by geographers (e.g. Howitt 1998) that are often present in commons scholarship.

Insufficient attention has been paid to the effects of reducing scale to size in the context of fisheries and other commons. For one, this maneuver obscures the “wider complex webs” of social, technical and ecological relations “that extend beyond the boundaries of vessels” (Murray, Neis, & Johnsen, 2006). For instance, fixating on boats ignores the range of fishing activities that take place from shore and other land-based activities along the value chain where women tend to work (World Bank, 2012). The labor, technologies, environments, and social relations that comprise the value chain connect each fish caught, “from the net to the plate” (Funge-Smith, 2018). It is estimated that half of this work is done by women (World Bank, 2012). While scholarship on the role of women and gender relations in SSFs (and other commons) is on the rise, attention to how scalar frameworks and related assumptions have contributed to the exclusion of women and erasure of gender is still needed. Reframing the ‘scale question’ in fisheries beyond a narrow and deterministic preoccupation with the size of male-dominated harvest technologies is one method for creating more representative fisheries science and socially and ecologically just CPR governance (H. Smith & Basurto, 2019).

Assumption 2: Scale as bounded levels

This notion that scales are composed of distinct levels is a commonplace understanding of the spatial organization of the world that often appears as a reflexive assumption in social science research (Moore, 2008), allowing analysts to “select a level *a priori* and then identify how it intersects with other levels” (Reed & Bruyneel, 2010). But partitioning the world this way creates several interrelated problems. First, the appropriate division of levels is often presumed, and processes are sorted into pre-ordained levels prescribed by frameworks or disciplinary norms. Second, repeated partitioning of social and ecological processes within a given multi-level framework creates the illusion that levels actually *contain* different things: tangible resources, ecological processes, information, knowledge, power. This reduces worlds to a ‘spatial grammar of containers’, where levels are metaphorically understood as “bounded, areal units encompassing and defining the people and processes supposedly located within them” (Moore 2008, p. 212). With repetition, entities appear as if *already contained* within certain levels and are often assumed to be relatively homogenous, purportedly sharing a degree of cohesion and similarity (*ibid*). This essentializes scalar relationships, easily evoking pre-formed associations and tropes such as ‘the local’ is static and authentic, while ‘the global’ is fluid and dynamic (Gibson-Graham, 2002; Tsing, 2000).

In commons scholarship attention is often paid to vertical and horizontal linkages among fixed levels (Cash and Moser, 2000; Armitage, 2008). Issues of scalar ‘mismatch’ between incongruent levels within or across scales is considered the “archetypal scale problem” in the commons (Cash et al., 2006). In SSF, emphasis on mismatches between the levels at which decisions are made and actions taken has led to the promotion of co-management approaches that aim to foster new linkages among actors at different spatial and jurisdictional levels. Yet, this institutional realignment presents new scale problems, where actors unaccustomed to working together are supposed to co-produce knowledge and govern fisheries in concert, despite differences in power, ways of knowing, and daily interactions with fishing environments. Cash et al. describe knowledge itself as a scale composed of discrete levels, where “knowledge is often held, stored, and perceived differently at different levels, resulting from differences across levels about what is perceived as salient, credible, and legitimate knowledge, or what is perceived as the important scale or level of the problem.” Their multi-level partitioning of knowledge imbues it with “thing-like” qualities and evokes a traditional-modern gap: knowledge “stored” at lower-levels is “experiential” and “traditional”, whereas higher-levels contain knowledge produced by formal science, depicted as “generalized and generalizable” (*ibid*). To resolve problems emerging from such “cross-level knowledge gaps”, Cash et al. suggest knowledge co-production initiatives can facilitate cross-boundary coordination and knowledge translation, fostering new linkages among separate scalar levels.

In contrast, human geographers have cautioned that “knowledge holders” and “knowledge types” cannot be divided neatly among levels. In her research on marine co-management in Belize, Gray (2016) demonstrates that attempts to facilitate knowledge integration or co-production do not inevitably reconcile competing claims or yield their intended results. Gray observed how actors across and within groups (e.g. fishers, scientists) made different knowledge claims, yielding “no consensus on what either ‘science’ or ‘local knowledge’ indicates” in marine governance (*ibid*, p. 1025). Whereas knowledge integration is often sought and considered a marker of sustainability in co-management (Olsson, Folke, & Berkes, 2004), it can actually serve to subjugate competing claims and erase important differences in understandings, motivations, and narratives (Gray, 2016), such as those that may occur along lines of race, class, gender. An emphasis on groups—such as “fishers”, “community”, or generic “resource users”—that are contained within pre-existing levels inhibits our grasp of intersectionality and analysis of difference in the commons. While commons scholars have challenged simplistic assertions for or against communities and related tropes about their innate abilities to manage their resources, the remaining tendency to operate from an assumption that certain levels already exist “makes it difficult not to

think in terms of social relations and institutional arrangements that somehow fit” their presumed contours (Marston et al., 2005, p. 422). In efforts to engage diverse actors meaningfully in participatory management in the commons, this can result in persistent blind spots for analysis of fisheries governance and other commons, where what does not seem to ‘fit’ into mental models of scalar levels may get left out.

Assumption 3: Scale as hierarchical ordering frame

Assumptions about scale as size and level often dovetail with the last assumption we highlight: hierarchy. Whereas human geographers have taken up a broader exploration of the relational dimensions of scale, often in the commons scaled entities are assumed to be hierarchically related: vertically nested levels of decreasing size. Like a Russian matryoshka doll, neatly nested scalar levels are metaphorically understood as arrayed from bottom to top, where lower levels are smaller and contained within higher/larger ones (Herod & Wright, 2008). Even where intermediary levels are presented in depictions of multi-level systems, the hierarchical schema is bound by the existence of a top and a bottom (Marston et al., 2005). Within any binary, one group invariably serves as the dominant referent to its other, bound up with assumptions about size, agency, and power (Jones, Woodward, & Marston, 2007). Therefore, when larger/higher levels are depicted as encompassing and influencing smaller ones, the agency of lower-levels appears constrained, where for example “the global is penetrating, the local penetrated and transformed” (Gibson-Graham, 2002, p. 27). This ordered relationship suggests that “more-is-up” (Moore, 2008, p. 217), making it easy to assume that power accrues at the top and can be “read off” in advance (Allen, 2011). The tendency to conflate size, agency, and power in hierarchically scaled systems makes it easy to discredit supposedly lower-level places and processes while overplaying the efficacy and absolute power of things supposedly global (Gibson-Graham, 2002). Working from a hierarchical schema, it is easy to conclude that in order to make a political movement, scientific conclusion, or policy recommendation powerful, it *needs* to be scaled up.

Initially commons scholars largely used hierarchical frameworks to examine scaled processes from ‘underneath’, revealing the often-overlooked importance of the local-level in multi-level systems. In recent decades, commons scholars have been increasingly called upon to scale up and demonstrate whether observations and principles derived from studies of small-scale CPR systems apply at higher scales (Agrawal, 2003; E. Ostrom, 2009). Like many other CPR systems, efforts to scale up knowledge on SSF are underway in the search for the “right” scale to govern them. As existing studies are synthesized, internalized assumptions about hierarchical scale and the exclusions they entail are only magnified. As Kleiber et al. (2015) demonstrate in their review of the relationship between gender and ecosystems in the context of ecosystem-scale fisheries governance, “the fact that they [women] are overlooked is often embedded in biased sampling methods” and efforts to synthesize this knowledge lead to an “underestimation of human catch, and an underestimation of the diversity of animals and habitats” fished, creating data gaps on women’s ecological knowledge and fishing practices related to marine invertebrates. As this knowledge is used to shape management and policy agendas, it has political effects, contributing to the exclusion of women from decision-making spaces and consideration of their specific practices, needs, and rights (Weeratunge, Snyder, & Choo, 2010).

As the charisma of “globalisms” captivated a range of social sciences at the turn of the century (including the commons), the imperative of scaling up flourished, inadvertently attenuating the role of the local and the small-scale in the wider task of understanding planet-wide interconnections and avenues for action (Tsing, 2000). Human geographers by contrast, reject the necessity of a hierarchical framework for the foundation of scale, and instead the “production of scale and inter-scale relationships becomes a matter for empirical investigation rather than a theoretical assertion” (Howitt, 2002, p. 305). As such, we do not argue that hierarchy is not a relevant component and often present dynamic of scaled relationships in the commons, but rather that the “tendency to partition the social world into hierarchically ordered spatial ‘containers’ is what we want to explain – not explain things with” (Moore, 2008, p. 212).

From epistemological choices to ontological assumptions

While much of the of the earlier work on scale and the commons explicitly conceptualized scale as an epistemological construct rather than a real entity (see Berkes et al., 1998; Gibson et al., 2000), this distinction was increasingly obscured in the proliferation of commons scholarship. Ingrained in popular frameworks (such as the design principles, levels of rules, and the SESF), it becomes “difficult not to think in terms of social relations and institutional arrangements that somehow fit” presumed scalar contours as “events and processes appear to come pre-sorted, ready to be inserted into the scalar apparatus at hand” (Marston et al., 2005, p. 422). As a result, current conceptions of scale in the commons are often saddled with a host of assumptions which can be problematic, leading to unintentional reliance on size-based objectivism, use of tropes, and attendant blind spots on power dynamics and critical forms of

social difference. Treating scale as given forecloses empirical questions about *how* particular scales come together, *why* some scalar configurations come to dominate, and *whether* and *where* new alignments are possible. Further, this elides epistemological questions about the limits and potential effects of how we choose to observe, measure, and represent our systems of study. To disrupt this pattern, we propose asking new scale questions.

Exploring the production of scale in the commons

Scale is a relational process: the organization of widely recognized scales and constituent levels in the commons may appear stable and inevitable in a given moment, but in shifting our own perspective we can understand these as the products of social and ecological relationships “that assume different configurations under changing conditions” (Zimmerer & Bassett, 2003, p. 288), which are “constantly made, negotiated, and transformed as people interact in specific times and places” (Gezon & Paulson, 2005, p. 14). To explore the dynamic production of scale in the commons we draw on theoretical developments by Sayre (2005) and Rangan and Kull (2009) to differentiate between three moments that come together to produce scale: “operation (Sayre’s ontological moment), observation (Sayre’s epistemological moment) and interpretation (the moment of translation)” (Neumann, 2015, p. 479). We add a distinction between these three dimensions of scale and the moments of action that produce them, and couple each with new reflexive and empirical scale questions they unlock as a typology for commons scholars to engage with (Table 1).

Table 1: A typology for commons scholars to disentangle the production of scale through the lens of three distinct dimensions and moments of action (Rangan & Kull, 2009). We link each dimension of scale to reflexive questions it raises and possible empirical questions to apply in research on the commons.

Dimensions of scale	Moments of action	Reflexive questions	Empirical questions
Operational dimensions of scale are related to the physical properties of things and biophysical and social phenomena that we experience and perceive as real.	Produced through moments of everyday interaction with the world, material processes, and the apparent ordering of things.	<i>How</i> do my own everyday understandings of scale shape my perceptions of the commons and my research?	<i>How</i> do historically and geographically specific socioecological processes produce scales that are recognized in the commons? <i>How</i> do different actors in the commons understand and experience scale through everyday acts of commoning?
Observational dimensions of scale arise as an attribute of how one observes something.	Produced through moments of observation and measurement as the parameters (e.g., grain, extent, identification of levels) within which phenomena are examined are set.	<i>How</i> do the parameters I choose to observe and measure in the commons affect what is made visible/invisible in my research? <i>How</i> do my everyday experiences of scale impact my choice of observational scale?	<i>Who</i> controls moments of observation and measurement in the commons and <i>what</i> are the effects of their chosen parameters? <i>How</i> are observational dimensions of scales negotiated or contested in the commons?
Interpretative dimensions of scale translate complex relationships into forms that are generalizable and affective and have normative implications (i.e., tell us how we should feel or what should be done).	Produced using interpretive devices (such as narratives, models, metaphors, symbols, and performances) that abstract as they communicate what aspects of scaled relationships matter.	<i>What</i> normative hierarchies am I invoking through my choice of interpretive devices and what are their effects?	<i>How</i> are interpretive devices used by different actors to make claims about scale in negotiations over environmental governance in the commons? <i>What</i> normative hierarchies are invoked in narratives, models, metaphors, symbols, and performances used to interpret the commons?

Three distinct dimensions and moments of action that produce scale

The operational dimension of scale is related to the physical properties of material things and the social and biophysical relationships that create the structures of everyday life (Rangan & Kull, 2009). We interface with and perceive scale in this sense as real (i.e., not a mere social construct) through our everyday interactions, which Sayre (2005) describes as the “ontological moment” of scale. While the material manifestations and operational dimensions of certain scales may be recognizable, these forms are never completely determined, rather they are *particular configurations* of time, space, and power (Rangan & Kull, 2009). In the context of the commons, this leads to empirical questions about *how* recognizable operational scales are produced in complex-adaptive systems and how actors in the commons encounter, perceive, and negotiate them through everyday moments of commoning (Nightingale, 2019). For researchers, this also raises questions about *how* our own everyday experiences shape our understanding of scale.

The observational dimension of scale is produced as institutional actors involved in the measurement, analysis, and management of the commons select social and biophysical units and parameters for observation (Rangan & Kull, 2009). Scale is, in this sense, partly an attribute of how one observes something, what Sayre (2005) calls the ‘epistemological moment’ of scale. As analytic focus shifts between units or levels during observation, what changes is not the “the elements themselves’ (the features on a landscape, the ecological process affecting a social formation, the cultural practices performed by people)” but “the relationships we perceive between them and the ways in which we might emphasize specific elements for analytic attention” (Howitt, 1998, p. 55). While moments of observation are often paired with claims to objectivity (i.e., neutral choices based on operational or ‘natural’ scales), where boundaries are drawn and what is included are often the subject of contention (Rangan & Kull, 2009). As different actors question each other’s choice of “categories, their resolution, the delimiting of extent and boundaries, and presumed order and disposition of relationships among them” claims to the ‘right’ or ‘best’ observational scale are contested and can change over time (ibid, p. 12). This second dimension of scale raises questions about *who* controls moments of observation and measurement in the emergence or persistence of commons, *what* the effects of their repeated performances are for different actors and entities within, and *how* competing claims are negotiated and contested in collective action processes. Further, given the performative effects of observational scale (i.e., that repeated moments of observation can give rise to new material orders), researchers should also reflect on *how* their own analytic choices shape what is made visible through the production of knowledge on the commons.

The interpretive dimension of scale is produced as explanations of spatiotemporal difference are “articulated, challenged or defended” through interpretive devices such as narratives, models, metaphors, symbols, and performances (Rangan & Kull, 2009, p. 8). These moments translate scale in two senses, simultaneously abstracting relationships, making them generalizable, and appealing to normative hierarchies and existing orders that evoke feelings like urgency, dissonance, familiarity, or outrage. Hardin’s “Tragedy of the Commons” exemplifies the power of the interpretive dimension of scale to impart both truth and emotion: a simple story about a grazing pasture, herders and the calculus of sheep became an abstract, scalable model of human behavior and environmental inevitability that purported to apply from the local to the global. The Tragedy of the Commons is a story built on “essential logics and relationships of a limited number of abstracted causal factors – rational self-interest, limited resources, population growth,” that incites anxiety and the supposed necessity of abandoning the commons (ibid, p. 14). The interpretive dimension of scale is enacted through discourses and performances by established experts and institutions (including scientists such as Garret Hardin) but is also contested through alternative performances that can challenge such representations and their authority (ibid).

Distinguishing between the operational, observational, and interpretive dimensions of scale provides language that can bridge gaps in understanding, both within and across disciplines, about the meaning of scale that can often be traced to conflation among these (Sayre, 2009). While distinct, recognizing the interrelationships among these dimensions of scale is also critical to understanding the intersecting biological and social processes that produce it: existing interpretive frames influence choices of observational scale and can also influence our perceptions of operational scale through our everyday experiences, and vice versa. “Holding the moments of scale apart” is a common problem Sayre identifies, especially in the biophysical sciences, where operational scales are treated as objective while observational scales are independent and subject to disciplinary norms. Equally problematic is the tendency of some post-structural human geographers to collapse all moments together under the banner of “social construction” (Sayre, 2005, 2009). Among the diverse theoretical orientations to scale in geography and political ecology, we elevate this approach because it resonates with commons scholars’ shared interest in the environmental dimensions and physical sensibilities of scale while addressing the representational power of scale within a critical realist frame (i.e. biophysical reality is ‘externally real’ to human experience, but our ability to comprehend that reality is partial and socially constructed; Forsyth, 2001).

Moving forward: practical steps to critically rethink scale in research on the commons

Finally, we ground these dimensions, moments of action, and empirical scale questions within a series of steps commons scholars can apply in their research process to help critically rethink scale (**Figure 3**). First, we encourage scholars to ask themselves, what assumptions about scale am I already making? Beginning from this basic question creates space to reflect on assumptions we bring from our own everyday experiences (e.g. operational dimensions), disciplinary conventions, or the structure of models and frameworks in use. As discussed previously, equating scale with size, level, and hierarchy are widespread assumptions that pervade many disciplines which, when left unchallenged, contribute to blind spots. Therefore, pausing to reflect on these assumptions (and what they might already be excluding from analytic consideration) is an important first step in determining research scope. Second, we can ask, what dimensions of scale can I identify? Upon closer examination, likely we can notice all three dimensions of scale shaping governance in the commons (**Table 1**). Third, we can search for instances where each dimension of scale is enacted and performed, whether past or present, and how these actions stabilize, challenge, or transform existing scalar forms. Lastly, reflecting on the limitations and tradeoffs inherent to our chosen approach to scale effectively communicates that scale is not objective or external to the research process and creates space to consider alternatives. We propose these steps as iterative, where ongoing exploration of our own assumptions raises new scale questions, and vice versa, as different facets of the complex connections and relationships that constitute the commons are revealed throughout the research process.

An illustration: Rereading scale and gender in small-scale fisheries policy

Here, we briefly demonstrate our own efforts to apply these steps in our research on gender and SSF policy change, focusing on the *Voluntary Guidelines for Securing Sustainable Small-Scale Fisheries in the Context of Poverty Eradication and Food Security* (the SSF Guidelines or Guidelines). The passage of this policy by the United Nations in 2014 was widely celebrated, marking a monumental shift in the discourse of fisheries governance by centering the needs of SSFs within a framework of social and ecological justice instead of bioeconomic rationality. Civil society organizations (CSOs), academia, and policy circles alike have endorsed the SSF Guidelines both for the wide-ranging participatory process through which they were developed and the unorthodox and decidedly ethical principles they espouse. For instance, the SSF Guidelines were developed through a global consultation process with over 4,000 representatives including fishers and their organizations, and the text itself rests on a human-rights based approach to

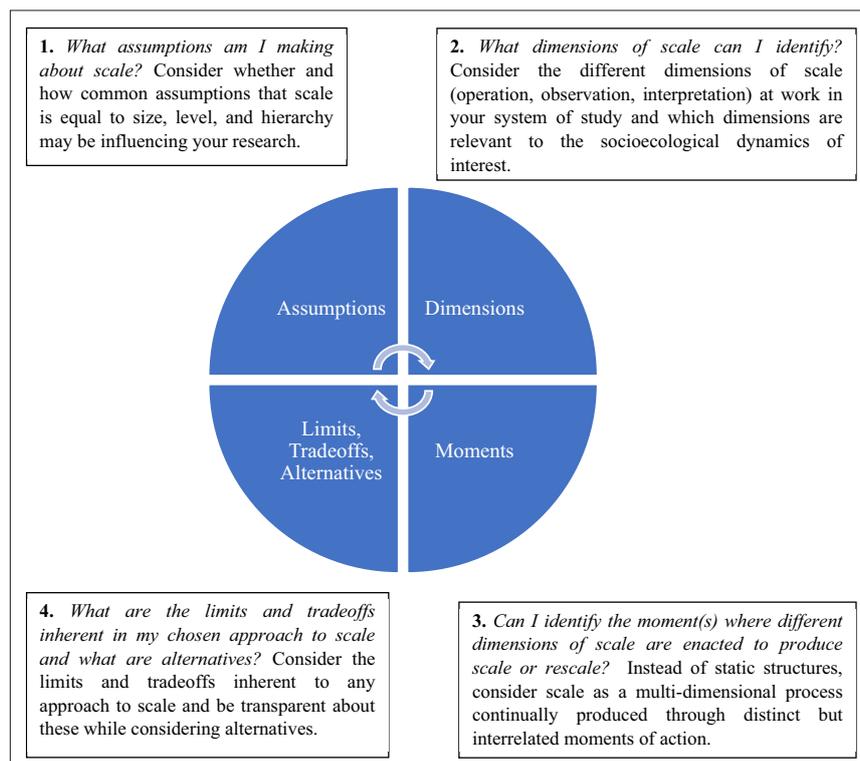


Figure 3: Steps to critically rethink scale in our own research and praxis in the commons.

fisheries governance that fisherfolk organizations had been advocating for and struggling to insert into global policy tools for decades (Sharma, 2011; FAO, 2015; Pictou, 2017). The five thematic sections of the SSF Guidelines highlight ethical principles for responsible governance, including tenure security, decent work, attention to the value chain, gender equity, and climate change adaptation. Each of these principles was left intentionally open-ended in the text, to be determined through the process of policy implementation guided by a participatory and representative cohort of actors from across the sector in each place (Jentoft, Chuenpagdee, Barragán-Paladines, & Franz, 2017).

The process of policy implementation has the potential to realign power and existing orders that structure CPR governance. Thus far, the main questions that have been posed in relation to scale have been whether or not the Guidelines will scale down in practice (Jentoft, 2014), and as it is mobilized, how it will cohere with pre-existing policy frameworks at different scalar levels (e.g., national, regional) (A. Song, Cohen, Hanich, Morrison, & Andrew, 2019; A. M. Song, Cohen, & Morrison, 2017). These questions presume that scale itself is apolitical and immobile—a multi-level, hierarchical backdrop—focusing on whether and how the policy tool will move across scalar levels and interact with the entities already contained within the ‘policyscape’ (Blythe, Armitage, Bennett, Silver, & Song, 2021). Instead of replicating these assumptions, we search the text of the policy itself for traces of alternative performances of scale that might challenge the status quo of multi-level hierarchical order. Through the three dimensions of scale (**Table 1**), we consider how the SSF Guidelines subvert presumptions about the ‘natural’ scale of SSF (their operational dimension), the ‘right’ scale to observe and organize them (their observational dimension), and how SSF are translated as a domain of social, ecological and economic concern (their interpretive dimension). We couple this reading of each dimension with parallel moments of action we have observed in our own research on policy implementation in Tanzania.

First, we consider the historical production of scale in SSF governance. In relation to industrial fisheries, issues of SSF governance have often been overlooked or erased as longstanding local institutions were frequently disregarded and replaced by national oversight. SSF were marginalized, and their lowly status normalized, by powerful actors repeatedly framing them as an economically backwards activity from the past, located at the bottom of an evolutionary ladder in the inevitable march towards an industrial fishing future (Jadhav, 2018). This evolutionary narrative created a normative rationale for action: develop SSFs into industrial fisheries or wait for their inevitable replacement as they are outcompeted. Development actors such as the World Bank followed this logic in their investment strategies throughout the 20th century, supplying technology and infrastructure inputs to transform SSF into supposedly more rational and efficient modes of production (Hamilton, Basurto, Smith, & Viridin unpublished manuscript). Coupled with acts of observation and management that relied on the physical dimensions of fishing boats and gear (H. Smith & Basurto, 2019), SSF were positioned as small, local, backward, and politically insignificant—located at the bottom of sociospatial, jurisdictional, temporal, and economic hierarchies. Rather than natural or inevitable, we can unpack this ordering as an effect produced through interrelated moments of operation, observation, and interpretation. Operationally, SSFs were reduced to physical units of boats and gear that could be measured, aggregated, and organized by states who governed them. Repeated performances of observation by powerful institutions produced knowledge and related management practices that relied on these dimensions which were presumed to be fixed and essential (and purportedly objective), and evolutionary narratives and imperatives for action followed dictating how they should be governed.

The text of the SSF Guidelines challenges these conventional scalar configurations of time, space, and power that have dominated SSF governance. First, the SSF Guidelines counter assumptions about their operational dimensions or ‘natural scale’. The preface of the Guidelines defines SSFs as “encompassing all activities along the value chain – pre-harvest, harvest and post-harvest – undertaken by men and women” in inland and marine ecosystems (FAO, 2015, p. ix). Opening with this alternative definition avoids fixing the meaning of the term to standard techno-physical dimensions and acknowledges that SSFs are a lived and ongoing practice open to new configurations. Through this definition, the boundaries around the operational dimensions of scale are broadened and rendered more flexible, inclusive of a wider range of actors, environments, economic activities, and possible relationships among them. Through the policy implementation process in Tanzania, actors along the value chain including women have been brought into the space of formal fisheries governance. The policy implementation process is led by a National Task Team (NTT) of actors unaccustomed to working together, including representatives from women’s post-harvest processing cooperatives together with fisheries scientists, managers, and NGOs. Through NTT meetings and wider sector consultations, the operational dimensions of SSF are being challenged and performed differently, as different sets of technologies, knowledge, identities, and means of organizing labor in SSF are acknowledged and incorporated into the policy process.

Based on this alternative definition within the Guidelines, different observational dimensions of SSF also become possible. If SSFs are not defined by small boats and gear, then the parameters we use to observe and govern them look different too. Unlike most global environmental governance tools that impose narrow targets for policy implementation, measurement, and evaluation (Campbell, 2019), the “Guidelines do not prescribe a standard definition of SSF nor do they prescribe how the Guidelines should be applied in a national context” (FAO, 2015, pp. 1–2). The “Nature and Scope” section (2.4) specifies that implementation should be guided by a transparent and participatory process, where actors from across the sector come together to collectively reexamine how SSF have been defined, counted, and managed. In particular, the text calls attention to the longstanding marginalization of women and the necessity of redressing systematic exclusions in the definition, measurement, and management of SSF (Kleiber et al., 2017). In the implementation process underway in Tanzania, that pattern of counting boats and gear types to render official fisheries statistics is being challenged. As an alternative, the first national study to ‘map’ women’s fisheries organizations was commissioned by the NTT to gain a better picture of the landscape of women’s organizations, how they formed, what their capacities and needs are, and how gender relations shape the value chain. This study will include both formal and informal organizations representing harvesters and pre- and post-harvest workers, making different observational dimensions of scale in SSF visible as the structure and function of women’s networks of collective action are brought into relief.

Lastly, the interpretive dimension of scale is evident in the different stories told about the value and future of SSFs in the Guidelines. Part 1 of the policy grounds SSF governance within an ethical framework of human rights and Part 2 outlines further commitments to achieving gender equality and climate justice. While in past decades (and in some circles, at present) SSF were interpreted within the neo-classical framework of economic rationality, the SSF Guidelines are normatively concerned with social and ecological justice, noting that SSF “commonly suffer from unequal power relations” that marginalize them and leave them subject to the negative environmental effects of other industries (FAO, 2015, p. x). Rather than a backwards practice from the past, the Guidelines position SSF as imperative to a just, sustainable, and food secure future. Further, rather than merely speaking of empowerment, the Guidelines acknowledge that power cuts both ways: “existing power imbalances between different parties” should be recognized, and existing hierarchies between actors along the value chain and between SSF and other industries should be considered in light of human rights obligations (FAO, 2015, p. 3). Often, when gender inequality is acknowledged in the context of SSF governance, the story stops at recognition of women’s relative invisibility. However, through the implementation of the Guidelines in Tanzania, women’s SSF organizations are being mapped, not as a singular entity with a one-dimensional presence, but as a complex patchwork of women’s organizations formed through different modes of collective action. Both the act of mapping and the resulting map itself are alternative moments of interpretation of scale in SSF (i.e., performances and symbols).

Future research is needed to understand how scalar dynamics unfold as the SSF Guidelines are implemented and performed in place. While the text of the SSF Guidelines is rooted in ethical principles that were developed in a participatory manner, how they are enacted and to what effects remain to be seen. Through our initial research, we highlight moments where alternative readings of the dimensions of scale in SSF and related performances are possible. However, enactment of the Guidelines could be subsumed by existing definitions, observational metrics, and interpretive devices that already structure governance debates about SSFs in different nations. Our iterative process of questioning assumptions, asking new scale questions, and reflecting upon what they make visible continues as we study gender and policy implementation of the SSF Guidelines.

Conclusion

Commons scholars are increasingly interested in the dynamics of multi-level governance and cross-scalar institutional arrangements in CPR governance. The concept of scale is central to this and other areas of research in the wider field of the commons, yet the dominant approach to scale has limitations. The purpose of this paper was to trace influential treatments of scale by commons scholars, analyze resulting patterns, and explore the relevance of some elements of scalar thinking from outside fields to enrich the ways we conceptualize, study, and imagine the commons. Early commons scholars broke disciplinary norms and boundaries in economics and political science by charting an unorthodox approach to scale, studying local processes and multilevel dynamics, eschewing restrictive scalar silos that pigeonholed theorists into a singular frame of reference. As the field further developed the focus on CPR governance in collaboration with natural scientists post-2000, a relatively stable approach to scale was established that conceived of scale as multi-level and hierarchical, fundamentals that became embedded in conceptual frameworks that remain popular.

The popularity and consistency in this approach to scale has had several advantages for commons scholarship. However, a lack of ongoing dialogue and critical reflection on the use of scale has substituted epistemological choices about how to treat scale for ontological assumptions that often equate scale with size, fixed levels, and hierarchical order. To move beyond these confines, we have endeavored to inflect new perspectives on scale to transform the ways we study and understand the commons as open-ended configurations of time, space, and power. Borrowing notions of scale from outside the current terrain of commons literature can destabilize reified notions of scalar levels and hierarchically ordered relationships while prompting a new wave of attention to the production of scale in the commons. To unsettle the concept of scale, we suggest focusing on scale as a process and offer tangible theoretical and methodological steps as an entry point to rethink scale in the commons.

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