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Elgar Encyclopedia of Environmental Sociology

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https://doi.org/10.4337/9781803921044.ch04

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Conceptual cornerstones of assemblage theory

Assemblage theory is an approach that emphasizes how phenomena in our world are the product of many different things, and different kinds of things, relating in ways that create a socio-material reality. Manuel DeLanda, who has led much of the theorizing around assemblage theory, has defined an assemblage as 'relations of exteriority' (2016:10). That is, assemblages are constellations of things acting in ways that relate and in ways that may bring out certain characteristics and functions of those things. For example, we might see a forested landscape with a river and a narrow stone footbridge. The properties of the bridge are actually a function of the river and the desirability of accessing land on either side of the river, and the mobility of the human body that gives a bridge particular implications for our daily lives. If we wanted to extend our understanding of the socio-material functioning of the landscape further, we might also say that the existence of vehicles and their largesse compared to the narrow bridge helps us define it as a *foot*bridge, and perhaps its representation on Google Maps and existence in a particular kind of landscape makes this footbridge important for both daily commuting and for tourists. Before too long, we might find ourselves linking a lot of different practices to the socio-materiality of the footbridge: practices that cannot be explained if we only looked at social processes (the desire for human movement across space) or material infrastructures (the landscape features and their interconnection). As this example illustrates, the assemblage approach emphasizes relationality, complexity, and situatedness:

it suggests that, in any given situation, there are a variety of things – objects, rules, living beings, technologies, policies, people – that are co-constituting each other due to their situation in a certain time and place. It is an approach that is used to tease out complexity and particularity in an attempt to deeply understand what is happening and why in a practical and materially grounded way. It can be a particularly useful approach to take in trying to explain unique cases and phenomena, the unexpected outcomes of a given set of conditions, or the inability to intervene and change a pattern of action that is undesirable.

Assemblage theory is part of a suite of theories that began to emerge in the 1980s and now underpins what is sometimes called *the new materialism* (Coole and Frost 2010; Van der Tuin and Dolphijn 2012). Theories like actor–network theory and assemblage theory were attempts to highlight the role of "non-human actors" in social life, explicitly in contrast to social theory seen to be overly committed to social sources of power and agency to the complete neglect of the role of materials. An assemblage consists of two interrelated processes: the *machinic assemblage* (the physical entities, both humans and non-humans, that are held together) and the *assemblage of enunciation* (the meanings expressed by the becoming of those entities). Within this material turn, assemblage theory developed from the work of Gilles Deleuze and Félix Guattari, where seeds of the ideas were embedded in their two-volume text of *Capitalism and Schizophrenia*: *Anti-Oedipus* (1983) and *A Thousand Plateaus* (1987). Within *A Thousand Plateaus*, the authors do not define an assemblage or assemblage approach clearly, and the word "assemblage" is a rough English translation of the French "agencement," which Deleuze and Guattari use in their text. Since then, and particularly in the first decade of the 20th century, it has gained significant currency in the humanities and social sciences. Below, we briefly describe some of the ways that assemblage theory constructs space-time and power in ways that situate its contemporary popularity, before describing some examples of its current use in environmental sociology and adjacent fields.

Assemblage theory and space-time

A strong thread within assemblage theory and other theories in the new materialism is an emphasis on the ways that a given constellation of heterogeneous elements is precarious. This is because the functioning of those elements and their characteristics are contingent on their relationships with everything else – that is, they have no stable core features that necessarily translate to every new environment, and assemblages exist within a broader complex world. As a result, assemblages are fundamentally unstable, because new elements may come along and bring out entirely different features of elements, and the assemblage may easily transform or unravel altogether. To cite Dwiartama and Piatti (2016:157), "there is no stability per se; there is instead a continuous process to create a quasi-stable state." Within this context, space and time are constructed through the assemblage, in the ways that spatial boundaries or spatial relations are shaped by the assemblage.

The assemblage plays a role in processes of *territorialization* (which consists of a concurrent process of *de-* and *re-territorialization*). The concept refers to the cognitive act of coordination, which involves a reconfiguration (weakening and reinforcing) of the boundaries of a given entity, such as a society, market, or governance structure. The territory itself is a conceptual environment (constructed by an individual or collective) that facilitates stable social relations and institutions, but whose boundaries continuously change as an assemblage takes shape. In *Anti-Oedipus*, Deleuze and Guattari locate the process of territorialization not in the physical space (as the definition would imply), but within the cognitive, individual, and social actions that are intended to create stability. In their case, for instance, capitalism is seen as a de-territorializing machine that deconstructs society and enables the re-territorialization of new social configurations (see also, e.g., Rosin et al. 2013).

Assemblage theory and power

Much of the work within a new materialist approach has received criticism for a lack of a coherent approach to power. Because these approaches flatten agency across multiple heterogeneous elements, suggesting that they

are all playing a part in generating a state of relations, there is no mechanism through which elements are forced to do something or enter into a state of relations. To some extent, assemblage theory has addressed this critique by looking at the act of assembling or *assemblying*. The latter is sometimes used to denote a form of gathering by actors, specific to the intentional formation of a particular kind of assemblage. As Tania Murray Li (2007:264) emphasizes in her work, "assemblage links directly to practice, to assemble." She identifies four processes that can be part of assembling and that create governing forces: (1) *forging alignments*, or bringing heterogeneous objects together; (2) *rendering technical*, or creating a set of causal relations; (3) *authorising knowledge*, or defining the arena of relevant knowledge; and (4) *managing failures and contradictions*. All these ways of assembling as an action emphasize the ways that assemblages are constantly in flux. Reflecting on this process of assemblying, Grove and Pugh (2015) suggest that an assemblage approach can be used to enhance a participatory development process.

Despite an emphasis on the action-oriented aspects of assemblying, some maintain that assemblage theory supports a tepid politics at best, failing to meaningfully articulate the maintenance of power inequities and injustice, or articulate clear pathways to social change (for example, see Müller 2015; Puar 2020). In these cases, authors suggest considering how assemblage theory may be combined with other approaches that may better align to the power struggles of a given context (see e.g., Murray Li, 2007, combining assemblage theory with Foucault's governmentality).

Applications of assemblage theory and environmental sociology

The popularity of assemblage theory in the social sciences can be attributed to a few factors. First, assemblage theory has been considered useful for an understanding of modern governance processes like those described by Foucault (1991; see also 1982), because these processes are diffuse and dependent on micro-expressions of power through a variety of institutions and actors. Along these lines, assemblage theory has been effectively utilized in analyzing neoliberalism, as seen in the works by Ong (2007) and Brady (2014), as well as in the field of environmental sociology, where it intersects with analyses of market-based forms of environmental governance. This work largely considers how neoliberal environmental governance strategies are practically enacted in ways that reflect local socio-material contexts (Brand 2007; Forney 2016; Lockie and Higgins 2007; McCarthy, Meredith, and Bonnin 2021; see also Forney et al. 2018).

Second, assemblage theory allows for analyses across geographic scales because macro- and micro-forces can all be part of a *translocal* assemblage. McFarlane (2009, 2011) in particular has mobilized the translocal aspects of assemblage theory to consider local experiences of globalization in the context of social movements and urban life. It has also been used to explain local experiences of market-based global environmental governance through mechanisms like fair trade or sustainability labels (Lockie 2009; Lyon 2019).

Third, like other work in the new materialism, assemblage theory breaks down divisions between subject and object because of the ways that elements are seen to co-constitute each other. This aspect of assemblage theory has given it an important place within feminist research approaches, as it necessarily situates human bodies and their definition within a socio-material network (see Haraway [1985] 2006; Puar 2020). As such, the gendering of bodies is performed through technologies, objects, and institutions.

It has gained significant momentum in environmental sociology and human geography in particular due to its smooth integration of social and environmental elements into an explanatory narrative. In doing so, it decenters anthropocentric forms of analysis while also avoiding material determinism, or the belief that non-human elements of life directly and necessarily cause particular kinds of human behavior (see Legun and Virens 2020). It has been used widely to analyze the social and ecological dynamics that generate experiences of environmental disasters (McGowran and Donovan 2021); forest management (Minor and Boyce 2018); social movements (Dwiartama and Piatti 2016); climate change and risk in fisheries (Berseth 2023); urban foraging and experiences of belonging (Poe et al. 2014); and technology and change in agricultural production (Comi 2019, 2020; Forney and Dwiartama 2023; Legun 2015; Legun and Burch 2022). In these analyses, things like social institutions,

networks of interpersonal relations, technologies, physical infrastructures, and non-human ecological actors like plants, animals and microbes explain dynamics within a phenomenon or situation: how it came to be, what holds it together, what interests it serves, and what is likely to cause it to change. For example, in their work on environmental disasters, McGowran and Donovan (2021) propose a disaster risk management (DRM) assemblage to help understand the ways that power and associated future visions are territorialized through processes of preparedness and anticipation. The DRM assemblages then manage human and more-than-human life, and their transformation, in moments of disaster. Poe et al. (2014) describe how plants, fungi, and discursive processes together formed experiences of belonging through foraging practices. Legun and Burch (2022) describe different ways orchards and vineyards are socially and ecologically assembled in anticipation of future robotic technologies in horticulture. In each of these studies, ecological and social life co-constitute each other in an ongoing process, so that researchers can account for both the influence of non-humans and social processes on an outcome, without overemphasizing the explanatory power of either, or pigeon-holing them into a static role combining to generate an inevitable outcome. As we see in the recent work of Berseth (2023), an assemblage approach may become increasingly appealing in the context of climate change where we expect to see increasing attempts to adapt complex ecosystems strategically and intentionally, managing human–non-human relations, amidst their ongoing transformation.

Notwithstanding the critiques, the main role of assemblage theory is to offer a different lens for understanding complex social phenomena, be they related to power, market structure, capitalism, or governance. Its fluid way of looking beyond structure by dissolving the macro- and micro-relations, and beyond stability by stressing ephemerality and quasi-stability, helps scholars of assemblage thinking to better explain the fast-pace global dynamics happening in our current era, from global politics (Allen and Cochrane 2010) to climate crises (Larner 2011) to digital technology (Forney et al. 2023). It stresses the need to embrace, and act, based on uncertainties and unpredictability in our everyday life.

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