

Law, Policy, Regulation, and Public Participation

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Environmental justice (EJ) movements have taken governments to task for failing to regulate environmental risks and harms adequately, denying meaningful public participation in administrative decisions and policy making, and refusing to integrate rights to environmental justice meaningfully into the legal process. Therefore, EJ activists recognize that engaging with state-led or state-controlled processes may not always be the best strategy (Liboiron et al. 2018; Pulido, Kohl, and Cotton 2016). Participating in litigation, policy, and regulatory action requires more resources, expertise, and influence than many EJ communities have. These slow and demanding governmental processes can sap movements' energy and co-opt them into ceding important goals. For example, despite numerous regulatory complaints and lawsuits brought by EJ advocates, the U.S. federal government has consistently refused to apply civil rights law to counter racially discriminatory impacts of siting and permitting of hazardous facilities (Foster 2018).

Critics of pursuing justice through the state argue that EJ movements may be better off challenging the legitimacy of state-led processes, withdrawing from them, and pursuing other strategies, such as direct action against polluters, organizing alternative institutions, and engaging EJ communities in mutual aid (Pellow 2018; Pulido, Kohl, and Cotton 2016). However, for EJ organizers, the question is often when to invest in state-based remedies or to take alternative actions, rather than whether to make a permanent choice between these strategies. Many movements have organized both within and against states to try to transform them over the long run (Purucker 2021). In addition, some Indigenous tribes are sovereign

TABLE 7.1. CER for EJ in Law, Policy, Regulation, and Participation

Dimension of Justice	In CER for EJ in Law, Policy, Regulation, and Participation
Distribution <i>Who ought to get what?</i>	Building community capacities to document disproportionate environmental risks and harms to EJ communities, demand remediation, and secure fair access to a healthy environment
Procedure <i>Who ought to decide?</i>	Supporting EJ communities' co-production of research to strengthen their influence in environmental regulation, policy, law, and litigation
Recognition <i>Who ought to be respected and valued?</i>	Asserting the validity of local knowledge and community-produced research in regulatory, policy-making, and legal processes Recognizing Indigenous sovereignty over environmental decisions on their ancestral lands
Transformation <i>What ought to change, and how?</i>	Researching for systemic transformation of administrative, legislative, and judicial processes to acknowledge the cumulative impacts of environmental and social risks, compensate and restore harmed communities, transition to safer substances and practices, and institutionalize community rights to a healthy environment for people and nature

governments, which seek to expand their sovereignty by engaging in intergovernmental relations with colonialist states on equal terms (Nagy 2022). As this chapter shows, there are examples of engagement with state processes that have won significant victories, particularly at the local level, and many EJ struggles approach the state with varying levels of cooperation and confrontation.

When EJ organizers seek justice through the state, they can draw on community-engaged research (CER) to document inequitable harms, legitimize claims, and envision remedies. This chapter discusses how CER has contributed to the development of community-centered paradigms for understanding environmental risks and safer alternatives, efforts to strengthen public participation in the regulatory process, campaigns that build community policy-making expertise, and litigation that complements EJ advocacy and organizing. Table 7.1 relates the chapter's major themes to the dimensions of justice common to CER and EJ.

REGULATION AND PARTICIPATION

EJ organizers and advocates have drawn on CER to inspire foundational changes in frameworks for environmental regulation and public participation. While polluters and officials still resist these changes, they are transforming how some governments assess risks, seek safer alternatives for hazardous substances and industrial processes, and involve the public in regulatory and policy processes.

*Cumulative Assessment of Environmental Risks
and Social Vulnerabilities*

CER for EJ has helped transform approaches to risk assessment used by regulators and policy makers to characterize the nature and magnitude of risks to human health and the environment. EJ advocates and allied researchers have shown how traditional risk assessment abstracts from real-world conditions in ways that understate risks to communities and block remedies (O'Brien 2000), including by

- testing for effects of individual substances and facilities, via individual environmental media, and from individual sources, rather than testing for the synergistic and cumulative impacts of all pollutants to which communities are exposed;
- testing for effects on the “average person” (usually a healthy white male), rather than on more vulnerable groups (such as children, people with compromised immune systems, and people in poverty);
- placing the burden of proof that substances and facilities are harmful on risk bearers (EJ communities), rather than demanding proof of safety from risk generators (such as manufacturers, users, and emitters of hazardous substances);
- requiring high levels of scientific certainty about the causes of harms before acting to prevent them, rather than acting to reduce plausible threats to health and the environment in a timely manner.

Since the 1990s, some jurisdictions have begun to move toward a more just and accurate risk assessment regime that considers cumulative impacts on communities, offers greater protection for vulnerable groups, demands greater evidence of safety from industry, and takes a more precautionary approach to regulating risks even if scientific evidence of cause and effect is not fully established (Corburn 2017).

Creating cumulative risk models that integrate measures of social vulnerabilities (based on socioeconomic factors such as poverty, race, education, and language) with environmental stressors (such as exposure to air and water pollutants, and hazardous chemicals) has been especially important (see box 7.1). These exposure indices quantify a population's risk from aggregated environmental and social burdens over time, and can be employed to create highly localized mapping databases of inequitable risk distributions (Cushing et al. 2015; Morello-Frosch et al. 2011). In the U.S., the data used in these tools are available in many cases because of public right-to-know laws that the EJ movement passed in the 1980s, which required polluters to make annual public reports of hazardous substances in their facilities and of emissions into communities.

Cumulative impacts analysis also engages communities in ground truthing environmental hazards and social vulnerabilities. CER projects organize community residents and researchers to correct and supplement gaps in regulatory

BOX 7.1. NEW TOOLS FOR ASSESSING RISK AND VULNERABILITY

California's EJ advocates, researchers, and state agencies have employed CER to create multiple online mapping tools for assessing cumulative risks and social vulnerabilities to inform policy making (Eng, Vanderwarker, and Nzegwu 2018). Foremost among them is CalEnviroScreen (<https://oehha.ca.gov/calenviro-screen>), which incorporates data on multiple environmental, public health, and socioeconomic risk factors to create a numerical score of the vulnerability of each census tract in the state. The state's Environmental Protection Agency (CalEPA) consulted with an advisory board of EJ researchers and grassroots leaders to write the definition of cumulative impacts and select relevant indicators, and improve initial drafts of the tool through multiple rounds of public feedback.

Other tools developed by researchers in collaboration with EJ advocates have influenced and supplemented CalEnviroScreen. For example, the Environmental Justice Screening Method includes a broader range of indicators than CalEnviroScreen (including race) and ranks cumulative impacts at a regional level (Morello-Frosch et al. 2015a). The Cumulative Environmental Vulnerabilities Assessment focuses on the state's San Joaquin and Coachella Valley regions (Huang and London 2012, 2016). The California Healthy Places Index (www.healthyplacesindex.org) summarizes social determinants of health at various geographic levels. The Drinking Water Tool (<https://drinkingwatertool.communitywatercenter.org>) identifies threats to groundwater, such as contaminants and susceptibility to drought, and gives information about how residents can influence groundwater management decisions. One of the most important influences of these projects has been to model how involving community members in ground-truthing data is necessary to ensure accurate mapping and assessment (Sadd et al. 2014).

These tools now integrate cumulative assessment into many policy and regulatory processes, from the local to the state level (Eng et al. 2018). For example, CalEnviroScreen is used to identify communities that receive prioritized funding from California's Greenhouse Gas Reduction Fund, generated by the state's cap-and-trade program, to prioritize areas for targeted enforcement of regulations, and to inform CalEPA's planning of community engagement and outreach (Murphy et al. 2018). Because mapping tools like CalEnviroScreen are publicly available, and their underlying data can be downloaded, researchers and EJ organizations can use these tools to identify inequities, and inform policy proposals and legal actions.

data by checking them on location (Sadd et al. 2014). Ground truthing can also be used to raise EJ challenges to emissions or exposure standards, which are typically set by regulators for a broad geographic area (e.g., using national air quality standards) or a type of pollution source (e.g., coal-fired power plants). When issuing permits for facilities, agencies translate these broad standards into local,

TABLE 7.2. Addressing Challenges of CER on Vulnerabilities Analysis

Task	Challenges	Potential Solutions
Defining relevant pollution sources and their health impacts	Multiple stakeholders have different definitions of sources and impacts	Engage stakeholders in dialogue to reach consensus on sources and impacts
Identifying viable solutions to pollution problems	Possible solutions may have their own secondary impacts	Elicit solutions from community dialogue, rather than determining them during analysis
Addressing tension between pollution parameters and health impacts	Health impacts are experienced below established standards for legal pollution	Foster stakeholder dialogue on pollution limits and impacts
Incorporating ground truthing into cumulative analysis	There is a lack of resources for systematic ground truthing	Identify additional funding sources for ground truthing
Resolving socio-environmental vulnerability	Analyses could reduce but not eradicate impacts of vulnerability	Facilitate improvements, even if incomplete or messy
Incorporating regional uniqueness	Different communities perceive pollution problems and solutions uniquely	Engage communities to adapt best practices to local contexts

source-specific requirements. Ground-truthed data can show how a region might meet standards for ambient air quality, yet contain multiple pollution “hot spots” from sources concentrated in low-income neighborhoods, or how a national standard for mercury in fish designed to protect the average consumer can fail to protect vulnerable groups that rely more heavily on fish in their diets (such as Asian Americans and Native Americans). While cumulative impact analyses have addressed some of the limitations of traditional risk assessment, there are important challenges that need to be addressed, as shown in table 7.2 (adapted from Huang and London 2016).

Alternatives Assessment

Alternatives assessment emerged in the 1990s to protect workers and consumers from chemicals of concern in manufacturing processes and consumer products. Traditional risk assessment was problem focused, aimed at quantifying the risk posed by an individual chemical to cause a specific hazard (such as cancer) at a given exposure level. This process was notoriously poor at informing policy and regulation, instead tending to induce “paralysis by analysis” by demanding years of costly research to establish whether a chemical posed an “acceptable risk.” In rare cases in which regulators moved to ban a substance, some manufacturers made regrettable substitutions of one hazardous material for another. In contrast, alternatives assessment is a solutions-based approach that aims “to support the informed transition to safer chemicals by comparing a range of options

to substitute a chemical of concern” (Tickner, Weis, and Jacobs 2017, 655). This involves “identifying, comparing, and selecting safer alternatives . . . on the basis of their hazards, performance, and economic viability” (Geiser et al. 2015, 2152). The U.S. Environmental Protection Agency (U.S. EPA), states such as California, and the European Union have begun to adopt this approach.

While alternatives assessment research is mainly conducted by researchers in academia, government, and the largest environmental organizations, CER partnerships with labor unions and frontline workers have translated this research into actionable knowledge used to promote policy and organizing for occupational safety and health. The Chemical Hazard and Alternatives Toolbox (ChemHAT) (www.chemhat.org) offers a good example. Unlike many official and technical databases, ChemHAT draws on global scientific records from many countries and institutions to characterize hazards in plain language and color-coded visuals. ChemHAT reports potential environmental impacts of substances, along with possible acute and chronic effects on human health, including cumulative and synergistic effects, and impacts on children and the immunosuppressed. Importantly, ChemHAT explains where one is likely to be exposed to each chemical, how to protect oneself, safer available alternatives, and links to the underlying, peer-reviewed data sources. ChemHAT is the product of participatory research conducted with workers by labor unions, occupational safety and health organizations, environmental groups, public health scholars, and digital media designers. The tool is designed to empower workers and their organizations to participate in managing risks from chemicals in their workplaces and engage in well-informed advocacy for safer substitutes.

Public Participation

For many EJ communities, procedural justice—the ability to exercise voice and influence over decisions that affect them—is an important goal as well as a method for achieving EJ. Public participation processes can involve the public in agenda setting, creating policy, and making decisions with government agencies (Rowe and Frewer 2004). Community participation can also contribute to better-informed decision making by governments and more effective environmental outcomes by generating policy solutions and increasing community commitment to implementing them (Ford-Thompson et al. 2012; Reed 2008). Public participation is encouraged and even required by many state and federal laws and administrative rules, and by international agreements, such as the European Union’s Aarhus Convention, the United Nations Declaration on the Rights of Indigenous Peoples, and the United Nations Sustainable Development Goals. Most of these participatory processes are advisory, but a few are empowered to make decisions directly. For example, participatory budgeting and municipal health councils—which involve community members in setting spending priorities and allocating part of their city’s annual budget—have addressed EJ issues of fair distribution of

public spending on public health, parks, transportation, waste management, and other services (Baiocchi, Heller, and Silva 2011; Coelho and Waisbich 2016).

However, many governments lack the will or imagination to engage less powerful groups equitably because of industry capture and corruption of administrative agencies and legislatures, inadequate legal frameworks for participation, and reliance on constrained forms of public consultation (such as public hearings) that disempower and alienate community members (Nabatchi and Leighninger 2015). As a result, the extent and quality of participatory processes vary widely—from minimal public notice and comment requirements, to extensive impact reviews and co-production of policies and decisions with residents. For example, hazardous waste siting processes “can be an exercise in democratic deliberation with the proposed host community, an aggregation of pluralistic viewpoints on the proposed siting, or a vehicle for exclusion of citizens most affected by the proposed land use” (Cole and Foster 2001, 106).

EJ organizers aim to increase their communities’ power in these formal decision-making processes, moving them up Arnstein’s (1969) ladder of public participation. At the bottom of this ladder, officials manipulate participatory processes or merely provide therapeutic opportunities for residents to express frustration, denying them real influence in decisions. The middle rungs describe tokenistic participation, such as expressing priorities or commenting on draft plans, when this does not influence final decisions significantly. At the top rungs, participants share power over decisions with government, either as partners or because decisions are delegated to community committees or given over entirely to the public to decide (through referenda, for example).

Rocha’s (1997) ladder of empowerment builds on Arnstein’s approach by representing degrees of power for underserved and underrepresented communities. In contrast to Arnstein’s understanding of power as the ability to influence others’ behavior, Rocha’s model especially focuses on power in the relationship between the self and others, highlighting structural and systemic influences on participation in policy making. Table 7.3 shows how CER for EJ can help community members climb this ladder.

To move up these ladders, and to plan and execute CER collaborations well, individuals and groups typically need capacities to deliberate within their organizations and with officials. Deliberative skills include proposing actions or policies, supporting them with reasons and evidence (from systematic data to personal experience and storytelling), listening and responding to others’ views, creating inclusive contexts in which all participants can contribute as equals, and arriving at collective agreements using decision rules that all participants can agree are fair and noncoercive (Karpowitz and Raphael 2014). Deliberation is not merely about learning to “talk nicely”; it is about actively countering the power of social status, money, credentials, and intimidation in public discussion so that EJ communities can influence decisions and share power over policy making.

TABLE 7.3. Rocha's Ladder of Empowerment in CER for EJ

Rung	Objective	Contributions of CER for EJ
Political empowerment	Ensuring communities have the resources they need to thrive	Showing the need for more understanding of CER's impact on political empowerment (Salimi et al. 2012)
Sociopolitical empowerment	Building community members' critical consciousness of their relation to power structures, and informed action	Increasing participants' critical understanding of political processes and facilitating collective prioritization of policy priorities (Minkler et al. 2008)
Mediated empowerment	Building the empowerment of individuals or communities to participate in existing decision-making processes	Engaging new residents in community policy making and inspiring some participants to run for office (Minkler et al. 2010)
Embedded individual empowerment	Increasing individual participation through an organizational context	Fostering group-wide identification and empowerment (Stack and McDonald 2018)
Atomistic individual empowerment	Increasing individual efficacy and changing the self-perception of the individual	Fostering participants' skills and self-confidence (Ferrera et al. 2015; Garcia et al. 2013)

The experience of engaging in CER can help EJ communities to develop deliberative capacities as they prioritize issues, and agree on research and policy objectives, deepening the internal democracy of EJ organizations (Minkler et al. 2008). CER has also helped to support deliberation between EJ organizations, government agencies, and the wider public. In some cases, universities have created new public forums for convening environmental deliberation. Some researchers have involved community advisors in designing, facilitating, and evaluating these forums, addressing the EJ aspects of issues such as health and bioethics (Abelson et al. 2013), land use planning (Sampson et al. 2014), climate resilience planning (Schlosberg, Collins, and Niemeyer 2017), and municipal budgeting (Lerner 2014). Sustained deliberative engagement has improved EJ-related policy outcomes, especially at the local level, for climate change adaptation, clean energy, community forest management, sustainable community development, and equitable distribution of public funding (Fischer 2017; Romsdahl, Blue, and Kirilenko 2018).

However, poorly conceived or bad faith deliberation by government officials and public policy makers on EJ issues can exclude disempowered groups, limit discussion to a narrow range of options determined by elites, or fail to affect policy when it challenges dominant political and economic interests (Cole and Foster 2001). In the absence of careful planning and commitment to equity, public discussion can reinforce hierarchies among participants based on their

TABLE 7.4. Core Values and Practices for Public Participation

Values	Practices
Inclusion: Ensuring the rights of those who are affected by a decision to be involved in the decision-making process	Making special efforts to recruit diverse participants and facilitate discussion on equal terms Enabling participation by residents of EJ communities by scheduling meetings in their neighborhoods or offering travel reimbursements, providing translators, and offering child care
Influence: Seeking input from participants about how they participate Ensuring the public's contribution will influence the decision	Welcoming diverse forms of communication and evidence, including personal testimony, stories, cultural beliefs, and emotional expression Adopting process and decision rules that grant participants influence
Recognition: Promoting sustainable decisions by recognizing and communicating the needs and interests of all participants, including decision makers	Avoiding enforced consensus on contested issues Treating oppressed groups' interests as integral to the common good, rather than sectarian or selfish
Information: Providing participants with the information they need to participate in a meaningful way	Full disclosure of accessible information that translates expert thinking into lay terms and languages used in EJ communities
Transparency: Communicating to participants how their input affected the decision	Giving a public explanation of the reasons and evidence for decisions, and how and why they relate to public participants' contributions

socioeconomic status, race and ethnicity, gender, or other characteristics. Table 7.4 lists some central values that CER can use to evaluate participatory processes, which are adapted from the U.S. EPA's National Environmental Justice Advisory Council (2013), along with practical steps to realize these values, as identified in the research cited above.

THE POLICY PROCESS

Policy analysis and advocacy have also provided fertile ground for CER. Unlike policy studies led by professional researchers, CER studies begin with community experience and knowledge, build local capacities to analyze problems and craft solutions, and seek to change the policy process by shifting power to the community level (Cacari-Stone et al. 2014). This section shows how CER can help communities build expertise in each of the major streams in Kingdon's (2011) influential model of the policy process, including defining problems, proposing policies, and practicing politics. Additionally, we discuss how CER for EJ across multiple levels of governance can inform translocal organizing and policy strategies.

The Problem Stream

To define problems, organizers and advocates must understand the issues at stake and legitimize them in the eyes of policy makers and the community. CER can help by enlisting community members in defining and documenting environmental hazards and injustices, and by producing usable knowledge that persuades decision makers to act. CER can help EJ groups overcome the barriers they face at this stage, including scant resources and credibility in policy arenas.

To foster community understanding, CER may assess local awareness of an EJ issue, measuring and elevating a community's environmental consciousness at this initial issue-spotting stage (Rickenbacker, Brown, and Bilec 2019). These data can then be used as a rallying point for community organizing and subsequent goal setting. CER can also play a key role in assessing the feasibility, desirability, and effectiveness of potential organizing and policy strategies. For bold, imaginative strategies that might face pushback, engaging community members in the production of actionable knowledge can help build trust and increase community buy-in.

In the problem stream, community organizations must intervene in a knowledge system that attributes credibility to actors with institutional legitimacy, such as scientists. In these credibility struggles, community members strive to gain recognition as valid knowers and interpreters. CER can help to legitimize community groups' knowledge by generating systematic evidence of the scope, scale, and kind of environmental injustices to command attention and support action. These data can be used as an entry point to gain legitimacy in the policy process by contributing to public comments, securing meetings with elected officials to discuss problems, and identifying policy remedies. However, community-based researchers must decide between using costly, state-of-the-art tools that can produce more valid or reliable data (increasing the data's legitimacy for officials) or using affordable, low-tech tools that may be less precise yet accessible. Often, this research identifies relationships between seemingly isolated instances of environmental harms to reveal a broader pattern of systemic injustice. Box 7.2 describes a groundbreaking

BOX 7.2. THE APPALACHIAN LAND OWNERSHIP TASK FORCE STUDY

Between 1870 and 1930, absentee corporations assisted by local speculators acquired much of Appalachia's natural resources. Many local political leaders collaborated with timber companies to clear-cut forests and with coal companies to dig mines while fighting miners' attempts to unionize. Hundreds of thousands of dispossessed Appalachians became economic migrants to the industrial cities of the North. Changes in land ownership disrupted communal ties and sapped residents' political power, leaving the remaining small landowners as "foreigners on their own land" (Horton 1993, 85).

(Continued)

BOX 7.2. (CONTINUED)

In 1979–1980, over 60 activists, community members, and academics led by the Appalachian Land Ownership Task Force carried out a massive study of land ownership patterns in six states: Alabama, Tennessee, North Carolina, Kentucky, West Virginia, and Virginia. Researchers revealed the scope of absentee corporate ownership and its effect on the regional economy. They showed how tax giveaways to large landowners deprived local governments of revenue needed to develop and diversify their economies and improve housing, education, and infrastructure. The six-volume report concluded with policy recommendations for creating a fairer tax structure, enacting legal reforms to protect surface land owners and small farmers from mining and logging pollution, empowering local governments to use corporate land for housing and alternative development, and establishing local planning and zoning processes to regulate environmental impacts and land use (Appalachian Land Ownership Task Force 1983).

The Appalachian Land Ownership study changed the public and scholarly conversations about the Appalachian environment and economy (Scott 2012). Researchers publicized their findings in community meetings, the news media, and government forums throughout the region, and in popular pamphlets and academic publications. The study informed years of organizing, policy advocacy, and litigation on tax reform, land reform, and poverty alleviation. Participants in the research went on to form new organizations, like Kentuckians for the Commonwealth, which brought white, low-income residents of the Southeast into the EJ movement. The study also helped to launch the interdisciplinary field of Appalachian studies, introduced many of its researchers to CER, and influenced their understanding of the region as existing in a neocolonial relationship to the corporations that had taken control of the area's natural resources and politics. As one activist put it, the Appalachian Land Ownership study was “a foundational source in understanding the history of Appalachia” (quoted in Scott 2012, 49).

study that developed communities' understanding of EJ and gained participants' entry into state policy-making circles across the U.S. Southeast.

The Policy Stream

Within the policy stream, politically viable solutions to problems are proposed, discussed, and selected. Proposals aim to mobilize public opinion and win public officials' support. Policy proponents must address potential benefits and risks of their proposals, and demonstrate expertise in policy making and policy processes. This stream includes the social relationships in which proposals are embedded, such as the communities of specialists that surround different policy topics. Policy specialists are not easily accessed or persuaded by EJ groups, who are typically seen as inexpert outsiders.

CER can help determine which policy approach to take or whether to engage the state through the policy process or other means. CER can be incorporated in

multiple stages of policy strategizing and development, including identifying community priorities (such as pollution hot spots or especially vulnerable residents), identifying policy options, and gaining inclusion in the policy process. This last stage can be especially important as CER builds community members' expertise about the roles and processes of the policy sphere. For example, in a community-engaged mapping project in Tijuana, México, residents were able to learn more about the urban planning process in their city and how to intervene in the community of specialists involved in urban zoning (Prado et al. 2021). CER also helped residents to engage in the interpersonal politics of policy making as they presented street-level environmental data they collected. Table 7.5 summarizes additional examples of how CER contributed to the major tasks in the policy stream.

The Politics Stream

The politics stream focuses on winning passage of policy changes, which may require EJ groups to mobilize public opinion, garner support from other social movement actors, influence policy makers, and engage in electoral politics. To do so, EJ organizations often must overcome limited access to decision makers, the power and resources of polluters and other opponents, and indifference among government agencies and officials. One of the formative urban EJ struggles in the U.S. illustrates how organizers can employ CER in multiple ways to build support for policy changes.

In 1996, West Harlem Environmental Action (WE ACT) confronted air pollution in their largely Black New York City neighborhood, where one in four children was afflicted with asthma, and residents suffered one of the highest asthma mortality rates in the country (Minkler, Vásquez, and Shepard 2006). Children reported that their asthma attacks were often triggered as they walked to school past one of six diesel bus depots in the neighborhood, where a third of the city's buses were garaged. WE ACT suspected that the particles in the diesel exhaust emitted by idling buses was a major contributor to asthma. However, they had no evidence of how much particulate matter the buses emitted, and the city's transportation authority refused to investigate the group's complaints.

WE ACT enlisted epidemiologists from Columbia University's Center for Children's Environmental Health to design an innovative study. Together, the partnership trained youth to measure street-level concentrations of diesel particulates using air monitors clipped to children's backpacks. They also taught the kids to count the number of buses, trucks, cars, and pedestrians that passed through busy intersections. Their research showed that particulate emissions were significantly higher than the recommended limits set by the U.S. EPA, and provided some of the first evidence tracing particulate exposure to bus exhaust (Kinney et al. 2000). Working with their community base, WE ACT developed several policy proposals, eventually convincing the city to convert its bus fleet to cleaner fuels. Next, WE ACT and Columbia expanded their research to examine effects of additional

TABLE 7.5. CER Examples in the EJ Policy Stream

Task and Source	Policy Issue	Partners and Location	CER Methods	Research Application	Outcomes
Identifying Priorities (Prado 2019)	Semitruck traffic and exposure to diesel pollution	Colectivo Salud y Justicia Ambiental and Environmental Health Coalition (Tijuana and Baja California, México)	Particulate matter air quality testing to identify hot spots and their relationship to trucking routes	Results were used in binational air quality forums and in meetings with municipal transport representatives	Research helped pressure officials to install “no truck” public signs along the most impacted streets
Identifying Policies (Minkler et al. 2008)	Food access and needs in low-income communities	Literacy for Environmental Justice and San Francisco Department of Public Health (Bayview-Hunters Point, San Francisco, California)	Community surveys on perceived access to fresh produce and food needs; semi-structured interviews with residents and merchants about openness to healthy food programming	Survey and interview data informed collaboration between the city supervisor and four city departments on a new program	A good neighbor program was established to persuade corner stores to provide fresh produce
Inclusion in Policy Making (Minkler et al. 2008)	Indigenous children’s exposure to lead-contaminated soil	TEAL partnership: Native tribal nations, academic researchers, and government agencies (Tar Creek, Ottawa County, Oklahoma)	Blood lead screenings and caregiver interviews before and after an intervention; organizational network interviews and environmental assessments of homes	Blood lead and environmental data were used to engage with the governor’s task force on Tar Creek, individual tribal governments, and the Indian Health Service	Research helped design a program for mandatory blood lead screening and parental notification, and new regulation on containing mine tailings

TABLE 7.6. WE ACT and the Politics Stream

Politics Stream Strategy	WE ACT Application	Policy Impact
Identify key policy representatives	Power mapping to identify air quality policy actors in New York	Results provided key targets for testimony, presentation of research findings, and legal action
Mobilize public opinion	Created health workshops for Harlem residents and an ad campaign on city bus shelters	Increased public awareness and support helped shift public transportation to cleaner fuels
Garner support from other social movement actors	Enlisted the Northeast Environmental Justice Network and the Children's Environmental Health Network to provide expert testimony to policy makers	Testimony influenced policy makers' understanding of diesel exhaust's health impacts
Influence policy makers	Meetings with federal and state air quality regulators, public comments, and litigation against city's transportation authority citing the group's research	EPA initiated its own permanent air monitoring in Harlem and nationwide, expanding the agency's role in gathering data about local air pollution

pollutants on larger samples of Harlem residents (Perera et al. 2002). Table 7.6 illustrates how CER contributed to multiple strategies in the politics stream.

Multiscalar Analysis and Policy

EJ policy making increasingly takes a multiscalar approach to all three streams of the policy process. This approach considers how local environmental injustices arise within larger systems and structures (such as global trade) that shift burdens from environmentally privileged areas to EJ communities (Pellow 2018). Multiscalar analysis also exposes the policies that enable these injustices, from the local to the transnational level, and shows how policy decisions made in one place or level can inflict violence on distant communities (Pulido and De Lara 2018). Struggles against these injustices typically gain strength from translocal information sharing and organizing, in which grassroots EJ organizations collaborate across jurisdictions and borders to address structural causes of harm at multiple points within the system. CER can be instrumental in understanding these complex problems, designing policies to remedy them, and participating in political action to change them.

CER has contributed methods and evidence to inform, enforce, or critique the local impacts of international law, policy, and treaties. For example, organizers and researchers have collaborated to expose how policy failures at the national and local levels have enabled the global trade in e-waste to contaminate workers

and fenceline communities (Smith, Sonnenfeld, and Pellow 2006), to evaluate the impacts of the North American Free Trade Agreement on EJ in the U.S.-Mexico border region (Environmental Health Coalition 2004), and to address climate change across the U.S.-Mexico border (Mendez 2020).

CER can also contribute to translocal policy development and advocacy. For example, the Trade, Health and Environment Impact Project (THE Impact Project), a partnership between the University of Southern California, Occidental College, and community-based advocacy groups, emerged from local organizing to address air pollution and other health impacts associated with goods movement through the massive Los Angeles and Long Beach ports complex (Garcia et al. 2013). Residents documented local impacts of increased port activity by gathering data on cargo truck traffic in neighborhoods adjacent to port and freight corridors. Using these data, a coalition of groups pushed local and state agencies to reduce diesel emissions and land use impacts of the ports. The project expanded to include homeowner associations, big green environmental organizations, and a coalition with labor organizations to organize for improved conditions for warehouse workers (De Lara, Reese, and Struna 2016). Recognizing that the global system of trade requires policy interventions at higher levels, the project launched the national Moving Forward Network, which connects coalitions around the U.S. working on port and freight issues to address federal policy affecting their communities.

CER IN THE LEGAL PROCESS

Legal action for EJ is often intertwined with policy and regulation. For example, EJ advocates often bring lawsuits to compel agencies to enforce their regulations, and EJ lawsuits (or the threat of litigation) can also result in new regulations and policies. Communities often pursue legal action when barred from other avenues for influence (such as public participation or policy making), when these avenues fail to achieve a community's goals, or when a regulation is violated. Legal analysis and strategizing can support organizing and political advocacy when used strategically (Kang 2009). For example, a lawsuit can draw media attention to an EJ campaign and prompt opponents to address community complaints, and can force corporations to negotiate with community groups. In some situations, filing a legal complaint is the only route to gain access to regulatory debates with agencies and polluters. The formality of the legal process can result in stronger (i.e., binding) solutions that a court can enforce; this is especially important when government agencies are contributing to environmental harm.

When engaging the state via its legal system, communities face many of the same obstacles that they face in the regulatory and policy arenas. Lawsuits are expensive and take considerable time and effort, drawing resources away from organizing and other forms of advocacy. Litigation also relies heavily on

TABLE 7.7. Traditional versus Community Lawyering Models

	Traditional Lawyering	Community Lawyering
Mode of Representation	Only individual client's needs are considered	Client's needs within the broader context of the community are considered
Source of Expertise	Attorney is the expert who speaks for the individual client	Attorney respects and draws from community expertise and knowledge, and is integrated into the community
Framing of Environmental Problems	Inadequacy of environmental laws or enforcement requires legal responses	Environmental problems may be political ones requiring legal and non-legal advocacy options to build community power
Strategies and Solutions	Attorney retains broad control over strategies and solutions to client's problems	Strategies are co-created by attorney and client in consultation with community to be responsive and accountable to them

professional expertise over community knowledge, limiting who can participate and represent a community. The highly technical nature of the law means an EJ suit may hinge upon the interpretation of a legal term and not necessarily address the root cause of an environmental issue. Even if successful, a lawsuit alone will rarely address the power imbalances that lead to environmental injustices. Given these challenges, legal action must be part of a broader strategy that empowers communities and respects their expertise by complementing EJ litigation with advocacy and organizing.

Community Lawyering and Client Empowerment

EJ lawyers tend to engage in *community lawyering*, a collaborative, community-based model of advocacy that uses the law to benefit marginalized communities with the goal of creating systemic change. It draws from the community-engaged poverty law practices of the 1960s, labor and civil rights movements, and other mass movements for social justice, giving rise to synonymous names like “movement lawyering” and “rebellious lawyering.” Community lawyering challenges the traditional top-down, attorney-client approach by situating lawyers and community groups as equal collaborators, respecting community expertise, and advancing community education. Table 7.7 contrasts community lawyering with the traditional model of legal representation.

A key aspect of community lawyering is *client empowerment*. In the context of environmental advocacy, client empowerment “means enabling those who will have to live with the results of environmental decisions to be those who actually make the decisions” (Cole 1992, 661). Attorney Luke Cole (1995) called this the “power model” of legal advocacy because it directly addresses the power (or polit-

ical) disparity that leads to environmental injustice. When evaluating any legal strategy or tactic, a community lawyer should ask the following (Cole 1992, 668):

1. Will it educate people (including community members, policy makers, the public, and lawyers themselves)?
2. Will it build the EJ movement?
3. Does it address the cause rather than the symptoms of the problem?

In working through these questions, a community lawyer and community group might develop an EJ strategy that includes legal (e.g., litigation) and non-legal (e.g., protest) tactics that tap into the community's strengths, deepen its knowledge, and build its power. Even if a community group chooses not to engage in the legal process, lawyers can help identify and weigh options and give legal advice for particular actions (e.g., participating in public hearings versus direct action). In this sense, community lawyering is the legal profession's equivalent of CER. The following section outlines how community-engaged lawyers can support EJ litigation with CER.

Uses of CER in EJ Law

Environmental legal actions usually fall into one of four types: judicial review of an agency's decision, public nuisance, toxic torts, and citizen suits. EJ lawsuits often challenge the construction of new sources of pollution or the expansion of existing sources. They can also challenge a government agency's decision, rule-making process, or failure to enforce environmental regulations. EJ lawsuits can also be filed against the polluters themselves. Each action requires a plaintiff to prove certain elements, which in turn requires certain kinds of evidence. For example, a community group could file a public nuisance lawsuit against a nearby factory emitting noxious fumes. In such a lawsuit, the plaintiff group must generally prove the defendant's action causes harm to the public, but also causes unique harm to them. CER could generate data that demonstrate elevated rates of respiratory illness from the fumes, but also show that residents who live downwind uniquely suffer from soot deposits in their yards.

CER can also be used in multiple ways in EJ legal advocacy. At the outset, it can generate data to better understand the scope and severity of environmental problems, and identify potential violations. This research can also gather evidence to support a particular legal argument, or inform the overall legal strategy (such as whether to file a new lawsuit or submit a friend-of-the-court brief in an ongoing case). When used strategically, CER can also lessen some of the disempowering aspects of taking an EJ fight from the streets into the courtroom.

Yet, there are obstacles to using CER in EJ litigation. CER-based evidence may not match the elements that must be proven to win an EJ case: evidence of environmental harms alone, such as data collected from typical community monitoring projects, may be insufficient for, or even irrelevant to, a particular

legal argument. There are also limits on what evidence is admissible and how favorably a court will view it. For example, according to federal evidentiary rules, scientific data must meet the requirements of expert testimony. This could impact a research project that uses affordable, low-tech tools that are community accessible but may be less precise than costly, state-of-the-art tools that might produce more reliable data.

One way around these challenges is having expert testimony, such as from an academic research partner, affirming that the CER observed known, tested, and approved scientific protocols for data collection; attesting to the quality of the research instruments; or addressing other evidentiary issues (Wyeth et al. 2019). Even without expert testimony, courts may consider lay evidence in cases where the evidence does not require specialized skill or knowledge, such as CER data that establish the presence of contamination that is visible, commonly known, or otherwise readily recognized by the average person.

Timing is also a limiting factor. Designing and executing a CER project and analyzing the data takes time, while statutes of limitations set the deadline for initiating a legal action. Some lawsuits (such as those challenging agency decision making) require a plaintiff to raise all issues beforehand during administrative proceedings. Unaware of such constraints, a community group could easily lose its legal right to sue if it misses a deadline, even if it has the most scientifically robust and legally relevant evidence.

Bucket brigades may be the best-known use of CER in environmental litigation. These are campaigns in which local citizens use inexpensive but technically validated plastic buckets to measure air quality near industrial pollution sites. The first campaign was in 1994 following the release of a chemical from a Unocal refinery in Rodeo, California. An estimated 200 tons of “catacarb,” a toxic catalyst used in oil refinery processes, leaked for over two weeks without any public acknowledgement from the company. Although local residents suffered from chronic health issues after the toxic release, they lacked proof that Unocal was responsible. A group of residents hired an environmental attorney, who worked with an engineering firm to design low-cost air-sampling devices for residents to monitor further leaks. These were based on the Summa canister, a standard device used by scientists for taking air samples. By using plastic five-gallon buckets, the engineers reduced the cost of each device from \$2,000 to \$250. In all, 30 buckets were issued to residents who sampled around the refinery whenever they encountered unusual odors, vapors, or flares. Based on these community-generated data and the public attention they garnered, Unocal eventually entered into a settlement agreement for \$80 million with more than 6000 local residents. Other EJ activists and community groups have since adapted the bucket brigade as an organizing model to create more public pressure on firms and regulators, to build community political power, to increase the accountability of polluters to nearby residents, and to improve regulatory compliance. Within a decade, the bucket brigade model

spread to over a 100 communities in 13 countries and 16 U.S. states (Overdevest and Mayer 2008).

A landmark 2019 case illustrates several factors that can contribute to successful use of CER. San Antonio Bay Estuarine Waterkeeper sued Formosa Plastics Corporation for repeatedly violating the federal Clean Water Act (CWA) by exceeding the amount of plastic waste it was permitted to discharge into Texas waterways, and for violating state and federal requirements to report such discharges. Because Formosa did not report its unauthorized discharges, regulators lacked evidence of them, so plaintiffs' claims were mostly based on community-collected evidence. After the court found Formosa in violation, the company reached a settlement including \$50 million to fund environmental projects in the local area, the largest citizen CWA settlement to date. Suman and Schade (2021) explain the reasons why CER was persuasive. One was the relatively simple type of evidence involved: direct observations and collection of plastic debris by hand, which did not require specialized knowledge or tools to analyze. The evidence also directly responded to the legal elements the plaintiffs needed to prove: Formosa's permit allowed only "trace amounts" of plastic discharge, meaning evidence of a single excess discharge was sufficient to prove Formosa violated the law. The sheer amount of evidence generated by CER—photographs, videos, and 30 containers containing 2428 samples of plastic waste collected during the three-year period—demonstrated the magnitude of the violations. Yet, as the attorneys explained, citizen science alone was not enough; key experts and testimony admissions were fundamental to the court's acceptance of CER. While the Formosa case is unique, it offers lessons in how to use CER to support EJ litigation effectively within broader advocacy and organizing.

Law and Legal Aid Clinics

Academic legal clinics and community law offices are two other important legal providers that frontline communities often turn to when facing environmental struggles. Both have unique roles to play in CER.

Environmental Law School Clinics. Environmental law clinics (ELCs) are law school programs that provide legal services to clients and often hands-on legal experience to law school students. Some ELCs practice client empowerment and community lawyering approaches. Most ELCs train law students in representing real-world clients under the supervision of experienced attorneys, expanding access to justice for individuals and organizations that otherwise could not afford legal assistance (Babich 2013).

ELCs are ideal places for law schools to develop programs for community-based research, as these clinics often have strong connections to community groups. Linda F. Smith (2004) identified three methodologies that clinicians can use to incorporate CER into their law school clinical programs. *Action research* is

a three-step process of developing a plan, implementing the action, and assessing the results of the action. This is often a useful approach for scholars to use in working with community members who seek to address real problems with focused interventions. In *problem-based service learning*, students work in teams to solve real problems in community settings by researching the issue and applying their theoretical understanding to the community concern. While this approach may not lead to “new knowledge” that is suitable for faculty publication, it does result in new knowledge for the community partner. Finally, *academically based community scholarship* is applied research guided by faculty and often carried out with the assistance of a class of students. This form of scholarship should provide the community partner with answers or solutions to an identified problem, and the faculty researcher should be able to convert the project to new knowledge that is appropriate for publication as legal scholarship.

Several ELCs stand out in their achievement of civic engagement and CER. The Environmental Law and Justice Clinic at Golden Gate University School of Law is one such example, which, in addition to providing legal representation and research for low-income community groups, has made important contributions to community-based environmental law scholarship. Others, like the Emmett Environmental Law and Policy Clinic at Harvard Law School, produce self-help guides and other advocacy tools developed from community partnerships. As law schools continue to grapple with fulfilling educational and public service goals, ELCs will remain important infrastructures to contribute to CER for EJ.

Legal Aid Clinics. Legal aid clinics, or community law offices (CLOs), are well positioned to serve low-income communities. CLOs develop long-term working relationships with community groups and an understanding of local power relations to identify potential allies. Most CLOs are also trusted by the communities in which they work and are sensitive to those communities’ needs (Cole 1992). This unique position makes CLOs important sites for CER, as they can connect researchers directly with community members. CLOs may themselves be subjects of research that seeks to better understand client needs and improve services.

The Escambia Project in Florida provides one such example. Led by local community services organizations and design experts, the year-long experiment launched in 2017 with the goal of increasing access to legal assistance. The Escambia Project is one of the first instances of using participatory design methods to reform the civil justice arena, ultimately engaging more than 100 community members, with support from dozens of local volunteers and organizations. Community members were equal partners and decision makers throughout the design process: they identified which ideas would be piloted and took part in their prototyping, testing, and evaluation. The project generated tools to help intake workers identify whether a prospective client has a legal issue and, if so, what kind, making

it easier to provide pro bono legal assistance to low-income neighborhoods, and to coordinate the delivery of legal help with other services offered in a single location (Moss 2020). Increased access to legal assistance can improve community members' ability to respond to environmental injustices and intersecting problems caused by poverty and oppression.

FUTURE RESEARCH

In addition to conducting CER for particular legal actions, policy campaigns, and regulatory struggles, future collaborations could promote transformative justice by strengthening the infrastructure of tools, processes, and institutions for conducting CER for EJ. It would be valuable to develop more screening tools that represent cumulative impacts and social vulnerabilities, like the tools developed in California. Research partners can enlist communities in additional ground truthing, to improve the accuracy and comprehensiveness of public data sets and the usefulness of these mapping tools. CER can support campaigns to require regulators to use these data to consider cumulative risks in permitting decisions, and employ these tools to develop additional policies and laws to address issues such as climate resilience in EJ communities (Roos, Pope, and Stephenson 2018). Collaborative research on how to expand the role of community lawyering, and academic law clinics and community-based legal aid clinics, for EJ is also needed.

CER can also look beyond particular campaigns and lawsuits to help develop broader frameworks for EJ law and policy work by enlarging the scope of impacts and vulnerabilities that shape people's environments. Jason Corburn has suggested that EJ research should examine the interactive effects of multiple "environments" that shape well-being, including

- (1) the material and physical environment (e.g., housing, streets, parks, air pollution, wealth, etc.),
- (2) the social and political environment (e.g., social cohesion, networks, political power, etc.),
- (3) the institutional and policy environments (e.g., the administrative decisions that shape places such as zoning rules, environmental impact thresholds, public participation procedures, etc.), and
- (4) the cultural environment (e.g., the meanings, interpretations, narratives, perceptions, feelings, and imaginations that get attached to places). (Corburn 2017, 63)

The goal of this kind of CER would be to involve residents of EJ communities in creating policy directions based on a common vision of "the kind of society we want to live in, whose lives are valued, and how restorative justice can address the damage already done to communities" (67).

Finally, for transformative justice, we need a better understanding of how residents in grassroots EJ communities can use CER to climb Rocha's ladder and share power in policy making and regulatory decisions. How can public participation processes be designed to increase grassroots EJ organizations' ability to participate

meaningfully and influence decisions? How can participation in CER most effectively build individuals' and groups' capacities to advance EJ through policy and legal action, especially to address complex, multiscalar impacts such as global trade in goods, services, and waste? What resources do EJ organizations need to engage more effectively in these struggles and how can CER help to provide them?