Supporting Information

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SI Materials and Methods

Interviews. In depth, confidential interviews (n = 45) were held with key individuals primarily from mining and hydrocarbon companies, but also from industry bodies, corporate law firms, private and multilateral financial institutions, and research institutes. The problem of interviewee access, which might otherwise have been difficult or impossible given the contentious nature of the topic, was moderated because interview requests came from persons working (or who had recently worked) within bodies that commanded both legitimacy and credibility with the industry, in particular the mandate of the former Special Representative on Business and Human Rights appointed by the United Nations Secretary General, and the Centre for Social Responsibility in Mining at The University of Queensland.

On the basis of the interviews, related field research, existing literature, and detailed case analysis, we developed a typology of costs incurred by mining and hydrocarbon companies as a result of conflict with local communities. Interview questions were semistructured and focused on the most frequent, greatest, and most often overlooked types of costs that arise from conflict; the methods used for identifying, assessing and aggregating costs; where responsibility for managing costs is assigned; whether information about the costs of conflict is used for the purposes of wider decision-making or incentive structures; and what the major incentives and disincentives may be for companies to better understand such costs and the issues in dispute. Interviews were held in person and over the phone and lasted between 60 and 90 minutes in duration.

Case Studies. Case studies of company–community conflict around mining operations (n = 50) were analyzed to generate an understanding of the issues in dispute, the manifestations of conflict, as well as the geographic and project characteristics (such as the project life-cycle stage).

The cases span time periods from 1967 to 2012; however, the vast majority of cases had a time period of analysis that began after the year 2000 (41 of 50 cases) and in no case did the time period of analysis end before the year 1998. The cases represent a diverse spread of geographic locations (Fig. S2), company type (Fig. S3), and primary commodity (Fig. S4). The criteria for selecting cases were inclusive. Cases were identified where prolonged or escalated tensions existed between local communities and mining projects and where adequate information was publicly available to code the case. Industrial action on labor issues that did not escalate into wider community conflict was not included within the sample frame. The coding typology was iteratively developed from existing literature (1), interviews, and case analysis.

Case material was identified through primary and secondary data sources, including industry journals, print media (including by search of the Factiva database), networks, academic literature, legal cases, company and civil society organization reports, and Web sites of companies and civil society organizations, and—for some cases—primary field research undertaken by the authors. Case details were anonymized and, where possible, sources were triangulated to improve accuracy. The coding does not differentiate between alleged and actual issues in dispute, partly because of the difficulty in reaching an objective assessment in any particular case, but also to capture the diversity of perspectives among the parties to conflicts. The coding does, however, distinguish between issues that may potentially arise in the future (potential) and those where the impacts were identified as already being felt (actual). The coding also distinguishes between the issues that the parties to conflict presented as the central issues in dispute (proximate issues) and the underlying issues that contributed to the state of the relationship between the parties, while not necessarily precipitating conflict. Multiple issues were identified for the vast majority of case studies so that percentages correspond to the proportion of the cases in which the issue was identified.

Because of the method of data collection and the type of data sources, the case sample frame may contain biases. Media reports and civil society organizations are likely to highlight dramatic issues and cases. It would be incorrect, for example, to conclude that where a mining company is subject to prolonged low-level tensions that the likelihood of project abandonment is as represented in our case sample. Exploration projects may be underrepresented where conflicts are local and small scale. Furthermore, English language data sources may underreport some geographic regions or types of company (such as state-owned enterprises), particularly where the country of origin of the company is the same as the project location. That said, a reasonable geographic spread is evident in the data. The case analysis therefore does not purport to represent the circumstances of the entire mining sector but instead draws insights from a case pool of prolonged or escalated conflict between local communities and mining projects. The case spreadsheet in Dataset S1 contains the case data.

Research on corporate culture and conflict management in Peru involved a combination of desk-based research and interviews involving five participating sites, including: Antamina, an open-pit copper-zinc mine owned at the time by Xstrata, BHP Billiton, Teck and Mitsubishi; Rio Tinto's La Granja copper exploration project; Barrick's 100% owned and operated Pierina open-pit gold mine; Tintaya, an open-pit copper mine 100% owned and operated by Xstrata; and Yanacocha, with its complex of five gold mines, owned by Newmont Mining, Minas Buenaventura, and the International Finance Corporation. These five sites represent different stages of the mine life-cycle, from advanced exploration through operations and toward closure. Interviewees included individuals from senior management, technical departments (exploration/construction/operations), procurement, government relations/communications, legal, human resources, security, social/community relations, and social development. The aim of the research was to identify aspects of corporate culture that are critical to the effective management of conflict with local communities. Before conducting the interviews, the study team held a half-day workshop in Lima, Peru with senior representatives from the participating sites, as well as three other mines. Discussions helped highlight particular issues that participants felt could be best explored through the interviews.

Research on conflicts and institutional learning in Peru involved two phases of key informant interviews. The first phase involved interviews with 97 key informants drawn from corporate, government, nongovernmental, social movement, and academic organizations. Interviews addressed the relationships between social conflict and institutional change and learning for both the mining and hydrocarbon sectors. Interviews typically lasted 60–90 min, were recorded and transcribed, and then analyzed qualitatively. Thematic analyses of these interviews are available in Spanish at http://wordpress.innovacionesinstitucionales.com. A second phase involved case studies of conflicts in two regions: Moquegua and Cusco. This phase involved constructing time lines of the evolution of mining and gas projects, and 39 interviews with key informants from government, private, nongovernmental, and social movement organizations involved in conflicts in the southwest of the country (referred to in the main text).

Sustainability Science Literature Review. We reviewed the four hundred and fifty-one articles published on sustainability science in PNAS to identify the extent to which the large-scale private sector has been identified as an actor within, and regulator of, socio-ecological system (SES) behavior. The review was undertaken on December 11, 2013, and utilized the PNAS advanced search database (www.pnas.org/search). Key terms were searched and each abstract individually reviewed. Search terms included: "corporate," "industry," "private or sector," and "company" in the title, abstract, or full text.

1. Franks DM (2011) Management of the social impacts of mining. *SME Mining Engineering Handbook*, ed Darling P (Society for Mining, Metallurgy, and Exploration, Englewood, CO), 3rd Ed, pp 1817–1825.

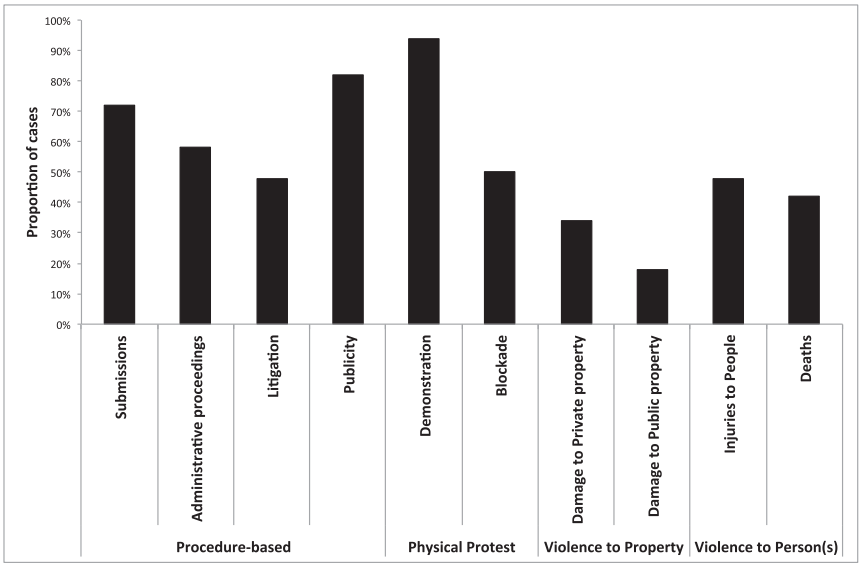

Fig. S1. Cases of mining company community conflict: Manifestations of conflict (n = 50).

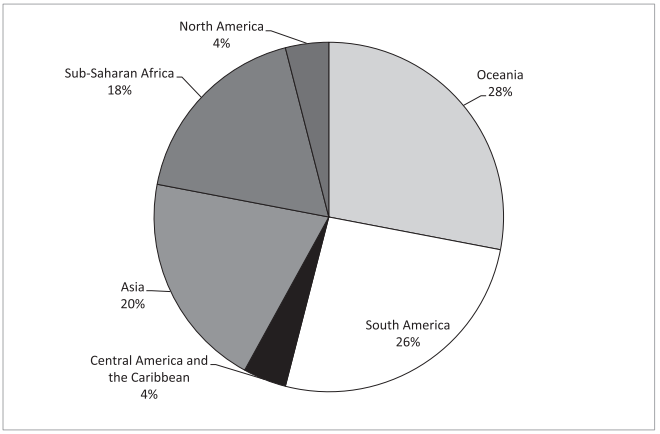

Fig. S2. Cases by geographic location (continent; n = 50).

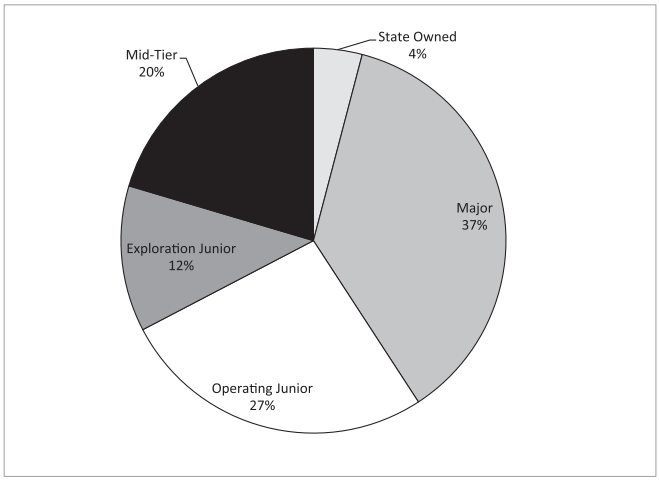

Fig. S3. Cases by mining company type (n = 50).

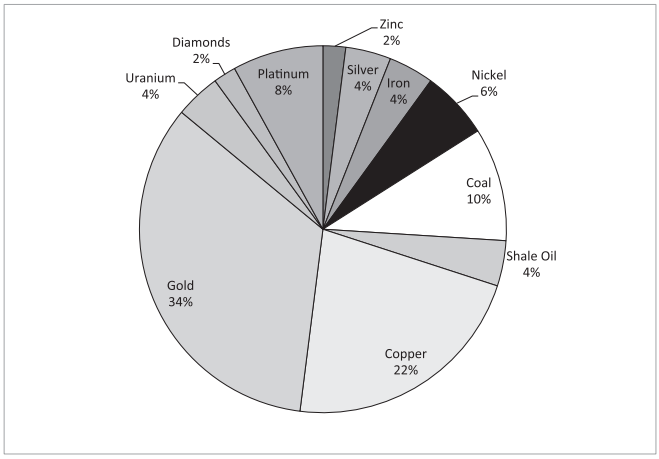

Fig. S4. Cases by primary commodity (n = 50).

Table S1. Types of costs that may be experienced by mining and hydrocarbon companies as a result of conflict with communities

Type of cost	Examples
Security	Payments to state forces or company security contractors
	Increased operational costs of security: fences, patrols, escorts, transport, alarm/leak monitoring systems, reduced mobility
	Increased security training and management: staff time, lost production, cost of programs
Project modification	Design modification costs: application, redesign, legal
	Additional works
Risk management	Insurance: higher premiums and coverage, risk rating, withdrawal of coverage
	Legal and conflict expertise: specialist training for staff; additional staff
Material damage	Damage or destruction to private property or infrastructure
	Damage or destruction to public property or infrastructure
Lost productivity	Operations discontinued: voluntary closure or enforced through injunction
	Temporary shutdown of operations
	Lost opportunity for future expansion and/or for new projects
	Disruption to production: delays, temporary or indefinite, absenteeism
	Delays in deliveries/supplies
	Greater regulatory burden/scrutiny
Capital	Loss of value of property: full write-off, other depreciation, sale at a loss, theft
	Inability to repay debt or default on debt
	Difficulty raising new capital
	Share price instability/loss in value (within relevant time period)
Personnel	Staff time spent on risk and conflict management
	Costs of remediation: mediators, meetings, negotiations
	Hostage-taking: ransom payments, rescue operations, compensation
	Arrests of staff
	Injuries to staff and deaths
	Low morale and stress-related effects
	Retention: higher salaries, compensation packages, bonuses
	Recruitment: advertising positions, screening, interviewing, induction training
Reputation	Higher expenditure on public relations: consultants, dissemination of information
	Competitive loss/disadvantage: impact on brand, investor confidence
Redress	Compensation (out of court payments)
	Fines
	Increased social and environmental obligations: health care, education and training, provision of other services, clean-up and remediation costs
	Costs of administrative proceedings or litigation: costs of proceedings themselves; judgment/settlement costs

Other Supporting Information Files

Dataset S1 (XLSX)