



Visualizing competing claims on resources: Approaches from extractive industries research[☆]



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Over the last decade, geographers have paid increasing attention to the mining, oil and natural gas industries, collectively referred to as the extractive industries because they involve the physical extraction of a resource from the earth (Bebbington, 2012; Bebbington, Bornschlegl, & Johnson, 2013; Bebbington et al., 2008; Bridge, 2004, 2008; Budds, 2010; Bury, 2005; Emel & Huber, 2008; Haarstad, 2012; Hilson, 2009; Perreault, 2013; Valdivia, 2008). The rapid growth of China, India and other emerging economies has driven growing demand for minerals and energy. This has led to dramatic price increases and, in response, extractive industry companies have sought out new projects – some in regions with a long tradition of resource extraction, others in areas with little or no such tradition. In many countries, the areas that are actually, or potentially, affected by natural resource extraction have grown significantly. This, in turn, has generated new pressures on resources as extractive industry competes for land, water, forests or coastal waters that are already being used by a range of other resource users: pastoralists, subsistence farmers, artisanal fisherman, small scale miners, urban residents who depend on distant water resources, export oriented agriculturalists, organic producers and others.

Analyzing such struggles over access to resources has been a mainstay of political ecology, an endeavor that seeks to “understand the complex relations between nature and society through a careful analysis of what one might call the forms of access and control over resources and their implications for environmental health and sustainable livelihoods” (Watts, 2000: 257). Political ecologists’ work, however, relies largely on narrative forms of analysis and representation and (with some exceptions) much less on cartographic, visual or quantitative forms. Yet, one apparent trend in conflicts over the environmental, land use and livelihood implications of this expansion of extractive industry has been the increasing use of maps as a means of drawing attention to the extent and the geography of the new forms of land use competition and conflict being driven by this expansion. Some organizations have come to the view that visualizing the geography of mining, oil

and gas investment and the myriad ways in which it overlaps with the geographies of other resources and livelihoods might be a particularly powerful way to advocate for policy and institutional change (for the Andean countries, see for example the work of organizations such as Cooperación [Peru], Instituto del Bien Común [Peru], Acción Ecológica [Ecuador], CEADDESC [Bolivia] and Fundación Tierra [Bolivia]).

During 2012, Oxfam America approached us with precisely this idea in mind. Oxfam America has worked on the implications of extractive industry for livelihoods and rights for well over a decade. Not only was it the first of the different Oxfams to take this topic seriously, it was also one of the first international non-governmental organizations to do so. Two countries in which Oxfam America had been particularly active in this regard were Peru and Ghana, and so when the organization proposed that we experiment with ways of visualizing the relationships between resource extraction and agriculture, they asked that our collaboration be focused on these two countries. This process, together with the reasons underlying Oxfam America’s growing interest in GIS and mapping, are described in Keith Slack’s paper in this issue.

In the process of doing this work we issued a call for papers for a session at the 2013 meetings of the Association of American Geographers that would bring together geographers who had experimented with visualization or the use of spatial metaphors as a means of analyzing and communicating the environmental and livelihood implications of extractive industry. The call became more successful than we anticipated and in the end one special session became two, and could easily have been three had not several persons who expressed interest ultimately been unable to attend the meetings.

This special issue brings together some of the papers that were initially prepared for that session. Four of these papers present experiences and experiments in the visualization and/or spatial analysis of relations among extractive industry, livelihoods, natural resource use and environment in a range of countries: Ghana, Peru, Tanzania, and Sierra Leone. In the two remaining papers Keith Slack discusses how and why visualization and mapping have become of particular interest for a large development organization concerned with rights and livelihoods, and Kenneth Young offers a critical commentary on the special issue taken as a whole. In addition to the articles included here, papers were presented on: the use of video and film in documenting livelihood and environmental

[☆] This is an introduction for the upcoming special issue on Extractive Industries in the journal of Applied Geography.

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implications of shale gas expansion in the US; the use of remotely sensed data to map dust pollution generated by mining in the Gobi desert; and the experiences of two separate environmental NGOs – Worldwide Fund for Nature and World Conservation Society – in using mapping to analyze the global and local implications of extractive industry for biodiversity management.

Many themes cut across the collection, but we close this introduction noting the following. The first is the evident power of visualizations – the graphical analyses in these papers reveal patterns that cause the reader to take pause on becoming aware of the scale of the land use competition and overlaps that are at play in these processes. Of course, with that power comes responsibility, and there is no doubt that it is quite possible to use maps in ways that can distort the conclusions suggested or supported by data (for instance, certain modes of mapping mining and hydrocarbon activity can easily *overstate* the geographical extent of their operations: see the Cuba et al. paper for more discussion of this). Given the political and communicative resonance of these visualizations, they are instruments that therefore have to be handled with care. The second is the power of collaboration. Most of these papers have been made possible by collaborations between GIScientists concerned with natural resources, and political ecologists and development geographers concerned with livelihoods and socio-environmental conflicts. Few if any of these individuals would have been able to deliver the analyses offered in these papers if they had worked alone, with their own skills, and their own knowledge. The strength of these papers lies in the collaborations that they embody – collaborations across dividing lines within our discipline that are still too rarely crossed, as well as collaborations between academics, communities and development activists or, in the case of Keith Slack's paper, collaborations among international and national NGOs as well as academics. The third observation (very much related to this second) is that the privileging of mapping and spatial analysis in these papers is in no ways meant to diminish the centrality of ethnographic, qualitative and other forms of social analysis and narrative interpretation. Indeed, one of the papers in the collection (by Roy Maconachie) is entirely qualitative

and narrative in form, and while it uses a spatial lens (as well as spatial metaphors) to understand interactions between youth livelihoods and extractive industry it does not mobilize GIS as part of its analytical armory. So this collection is not an argument to say “let's all go and map overlaps between land use and extractive industry.” It is merely to suggest that there is much to be gained from making explicit the spatiality of the relationships between the expansion of extractive industry and pre-existing forms of land use and land governance. These gains are at once analytical, communicative and political.

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