Applied Geography 54 (2014) 250–261

Contents lists available at ScienceDirect

Applied Geography

journal homepage: www.elsevier.com/locate/apgeog

Extractive industries, livelihoods and natural resource competition: Mapping overlapping claims in Peru and Ghana

Nicholas Cuba [a, *], Anthony Bebbington [a], John Rogan [a], Marco Millones [b]

[a] Clark Graduate School of Geography, Clark University, 950 Main St., Worcester, MA 01610, USA
[b] Center for Geospatial Analysis, Environmental Science and Policy, College of William and Mary, Williamsburg, VA 23187-8795, USA

Keywords:
Extractive industries
Agriculture
Concessions
Land use conflicts
Perú
Ghana

A B S T R A C T

Taking the cases of Perú and Ghana, this paper examines overlaps between the extraction of minerals, oil and gas on the one hand, and river basins, agricultural land use, and protected areas on the other hand. In particular the paper considers how far such overlaps can be revealed and analyzed on the basis of (relatively) accessible and affordable data, without having to use more expensive data generated by remote sensing or fieldwork. We use concessions as our indicator of the presence of extractive industry activity, focusing on both mineral and hydrocarbon concessions, and areas of exploration and of active resource exploitation. High portions of agricultural land use in both countries are located within areas that are subject to mineral or hydrocarbon concessions (38% in Perú, 39% in Ghana), predominantly within areas in which exploration activities are permitted or occurring (36% in Perú, 35% in Ghana). While overlaps between concessions and areas protected for conservation were much smaller (10% for Perú, 2% for Ghana), concessions overlapped with a larger portion of titled indigenous communities in Perú (35%). These findings help visualize the geographies of uncertainty and risk that the expansion of extractive industry creates for populations dependent on agriculture, land, water and other resources in areas affected by concessions. The visualizations – and the evidence of quite different degrees of overlap, depending on the type of resource in question – suggest the relative strength of different modes of land and resource governance in the face of extractive industry. Notwithstanding their well-documented fragilities, institutions for habitat conservation seem to have been better able to resist pressures on them from the extractive sector than do those for regulating water resources, agricultural land and indigenous communities which appear far less able to moderate the expansion of resource extraction.

Introduction

Investment in mining, oil and gas, the "extractive industries," has increased globally in recent decades, spurred by especially rapid growth in specific countries (Bebbington and Bury, 2013, 361 pp.; Bridge, 2004). This investment takes geographical form, expanding into spaces that are anything but "empty" (Deininger et al., 2011; Müller & Munroe, 2014). While these spaces might be new frontiers for extractive industry, in most instances they and the natural resources that exist within them are already occupied, used, claimed and governed by other social groups. These prior claims and uses might be related to production (as when these resources are already used for agriculture), material consumption (as when these spaces are sources of water for communities and towns) or cultural significance (when these spaces are symbolically important or areas of recreation) (Bebbington & Williams, 2008; Bury 2005; Finer, Jenkins, Pimm, Keane, & Ross, 2008; Lynch, 2012). Some of these uses, claims and occupations might be grounded in law (when there are juridical rights) while others are grounded in custom (when there is a long, historically constituted practice) (Budds & Hinojosa-Valencia, 2012). Some might exist in the present (e.g., areas currently used for agriculture), while others might exist in the future (e.g., areas understood by one or other actor as having agricultural potential). While some prior claims and uses are those of powerful actors (e.g., national systems of protected areas), more often than not, these spaces are occupied and used by actors who are far less powerful than the extractive industries now claiming access to the same resources and spaces (Bebbington, 2012; Bury, 2005).

While this competition for space and resources *could* lead to co-existence and synergies among forms of land use, in many instances it has led to conflict (Arellano-Yanguas, 2012; Hilson, 2002; Maconachie & Binns, 2007). This paper constitutes one point of

* Corresponding author. Tel.: +1 508 421 3706.
E-mail address: ncuba@clarku.edu (N. Cuba).

http://dx.doi.org/10.1016/j.apgeog.2014.05.003
0143-6228/

entry into making sense of such processes by using visualization, cartographic representation and spatial analysis to explore the potential relationships among different types of land use/land cover, and to propose techniques that can provide initial, pre-field proofing insight into the implications for livelihoods in areas within the vicinity of extractive industries (in this sense we build on work by authors such as Bury (Bebbington & Bury, 2009) and organizations such as Cooperacción [www.cooperaccion.org.pe]). The analysis is conducted for the cases of Perú and Ghana, both countries with significant and growing extractive sectors (Bebbington & Bury, 2009; Hilson & Garforth, 2013; ICMM, 2007). The two countries share long colonial histories of mining activity (Addy, 1998; Orihuela & Thorp, 2012), while having also experienced more recent growth in investment in hydrocarbon extraction (Finer, Jenkins, Keane, Pimm, 2008; Finer, Jenkins, Pimm, et al., 2008; Throup, 2011; Van Gyampo, 2010). In each country, increased investment in extractives has occurred in a context in which the state, though not strong, demonstrates some capacity for planning and regulating economic activity (Daviron & Gibbon, 2002). Finally both Ghana and Perú have large agricultural economies, with some parts of the country characterized by important export oriented sectors but yet more extensive areas characterized by rural livelihoods dependent on water-constrained agriculture and particularly severe poverty incidence (Budds & Hinojosa-Valencia, 2012; Crabtree, 2002; Finan, 2007; Hilson & Garforth, 2013; Läderach, MartinezValle, Schroth, & Castro, 2013; Ntiamoah & Afrane, 2008). The two countries thus share the challenge of having to manage relationships between two sectors (resource extraction and agriculture) that are each important for economic growth and poverty reduction. The comparison therefore helps us say something about the relationships between extractive industry, agriculture and natural resources in countries with a certain "mining identity," a policy commitment to enhanced resource extraction in both the mining and hydrocarbon sectors, and a government bureaucracy with some potential capacity to regulate (Bebbington & Bury, 2009). Finally, the comparison allows us to explore what can and cannot be mapped on the basis of relatively accessible, affordable and (supposedly) public data in these types of country context. This is important given that most bodies involved in monitoring extractive industries are limited to such data and unable to afford the cost of broad-scale classification of remotely sensed data or of extensive fieldwork. This concern for "feasibility", we hope, makes the methodological findings relatively more "applicable."

Extractive industry contexts in Perú and Ghana

Both Perú and Ghana have hard rock mining and hydrocarbon sectors, and in each country the history of hard rock mining is far longer than that of hydrocarbons. Oil was discovered in Ghana only in 2007 (Throup, 2011), while it has a longer twentieth century history in Perú. Each country was characterized by stagnation in its mining sector into the early 1990s. For the case of Ghana, ICMM (2007: 10) notes that "During the years of economic collapse, mining suffered along with other industrial sectors. Indeed, from independence in 1957 to the early 1990s not a single new gold mine was opened." This stagnation, however, was followed by more recent growth (ICMM, 2007). A similar expansion since the 1990s has been especially rapid in Perú (Bury, 2005). That said, growth has been most accelerated in the hydrocarbons sector, and rapid change in permitted exploration activities has been observed over vast spatial extents. Between 2004 and 2008 hydrocarbon concessions in the Peruvian Amazon increased from covering c. 13–14% of this region to 74% (see Finer, Jenkins, Keane, 2008; Finer, Jenkins, Pimm, 2008; Finer & Orta-Martinez, 2010). Meanwhile, since 2007, the majority of Ghana's near-coastal waters have become subject to hydrocarbon blocks, a feature that also characterizes much of the Peruvian coast. Throup (2011) comments that in Ghana, oil exports are projected to yield $1–1.5 billion p.a., or 6–9% GDP, and that oil is "poised to replace cocoa as the main driver of economic growth." There is, therefore, much enthusiasm about extractive industries in both countries at the same time as there is discussion of the risks associated with extractives as a path to development. Indeed, each country has experienced pollution, accidents and serious public health incidents related to extraction (Bush, 2009; Slack, 2012).

In addition to a large-scale, corporate extractive sector, each country has a significant artisanal and small-scale mining (ASM) sector. This sector has been particularly well documented for Ghana (Hilson, 2010; Hilson & Garforth, 2012) though has also grown rapidly over the last two decades in Perú (Asner, Llactayo, Tupayachi, & Luna, 2013). ASM activity can be both legal and illicit, and in certain cases (e.g. Madre de Díos in Peru), the areas affected can be extensive. For the purpose of the visualizations produced here we have not distinguished between these legal and illegal forms of mining. While the data on mining concessions will cover some of the ASM and illicit activity, as substantial amounts occur within concessions (Asner et al., 2013), the visualizations will not pick up on extra-legal mining in areas where there are no such concessions. In this sense, the study focuses primarily on corporate, medium and large-scale extraction due to the reliance on authoritative, broad-coverage data. Clearly these different scales and modes of organizing mining imply different sorts of demand on land use and natural resources, different types of relationship between agrarian and mining livelihoods, and different forms of social conflict around competition over natural resources. They would also demand different institutional forms and capacities to manage this land use competition.

Agriculture continues to be a vital sector in each country (Ghana Statistical Service, 2008; UN Statistics Division, 2012). On the one hand it is the largest source of full or part-time employment for the rural population, though much of this is low paid employment (Reardon, Berdegué, & Escobar, 2001). Agriculture is also, in each country, an important source of export revenue. In Ghana, cocoa is still the country's most important commodity, all for export (Daviron & Gibbon, 2002). In Perú, the last twenty years have seen a transformation of agriculture – above all in the coast – and the sector is now a dynamic exporter of vegetables and fruits (Crabtree, 2002; Freund & Pierola, 2010). Meanwhile in the highlands, and notwithstanding the growing significance of off-farm income (Escobal, 2001; Reardon et al., 2001), agriculture continues to be a foundational source of security in rural livelihoods (Milan & Ho, 2013). The relationships among extractive industries, agriculture and rural livelihoods are contested in each country (Bebbington, 2012; Schueler, Kuemmerle, & Schroeder, 2011). This paper takes no *a priori* view on how far this relationship is synergistic or antagonistic. The emphasis is, instead, on visualizing some of the ways in which these two forms of land use relate to each other, exploring what can be visualized without having to depend on more expensive and harder to acquire forms of remotely sensed and field-generated data (Rogan & Chen, 2004). These visualizations focus on the geographies of concessions to conduct exploration and those of operations to extract resources, and their relationship to other geographies of agricultural land use, strategic natural resources, and human occupancy of space.

Why concessions?

Our focus on the geography of extractive industry concessions and lots merits some discussion. Importantly, the geographical extension of a concession is far greater than that of the immediate