



A devil's bargain: Rural environmental injustices and hydraulic fracturing on Pennsylvania's farms[☆]



Stephanie A. Malin^{a,*}, Kathryn Teigen DeMaster^{b,1}

^a Department of Sociology, B234 Clark Building, Colorado State University, Fort Collins, CO 80523, USA

^b Department of Environmental Science, Policy & Management, University of California-Berkeley, 130 Mulford Hall #3114, Berkeley, CA 94720, USA

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ABSTRACT

Rural Pennsylvania, the epicenter of the Marcellus Shale region, hosts the most prolific unconventional natural gas extraction and production activity in the US. Farmers of small and midsized operations in Marcellus counties depend increasingly on incomes from booming natural gas operations, while the industry needs their land to access energy resources. These farmers thus bridge two economic sectors—unconventional natural gas production and agriculture. Related dynamics rapidly transform the social, economic, and environmental landscapes for Pennsylvania's rural communities. We ask: What, if any, are the environmental justice implications of the unconventional natural gas industry's presence in rural agricultural spaces, particularly for farmers with small and midsized operations? Presenting findings from 42 in-depth interviews, participant observation, and archival analysis, we show how farmers benefit from natural gas leases to support their agricultural livelihoods. However, they face a devil's bargain. Farmers risk entrenchment in a long-term web of natural resource dependence, increasingly unable to determine their livelihoods or land use on their own terms. Our study demonstrates how farmers' intersectoral dependence conditions procedural inequities and greater environmental risk. We show how farmers of small and midsized operations experience rural environmental injustices as they endure corporate bullying; face procedural inequities negotiating and enforcing lease terms; and increasingly contend with environmental risks associated with unconventional natural gas production.

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1. Introduction

In the last decade, hydraulic fracturing – an unconventional oil and natural gas extraction method – has been utilized at an unprecedented scale throughout the US (EIA, 2012), rapidly transforming the social, economic, and environmental landscapes for dozens of rural communities. Commonly known as “fracking,” hydraulic fracturing extracts previously inaccessible deposits of petroleum and natural gas trapped in shale formations. By

utilizing this technology and constructing a web of industrial infrastructure that includes tank batteries, pipelines, and compressor stations, the US has become the largest producer of natural gas and oil in the world (EIA, 2015a). The 104,000 square-mile Marcellus Shale gas formation beneath Pennsylvania, New York, Ohio, and West Virginia hosts the most prolific natural gas extraction activities in the US, producing over 16,000 cubic feet of natural gas per day² (EIA, 2015b). Marcellus communities experience extensive impacts from surging hydraulic fracturing and associated industrial development, sometimes near homes, hospitals, and schools.³

In Pennsylvania, the Marcellus region's production epicenter, many residents of impoverished rural counties like Bradford and

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* Corresponding author.

E-mail address: stephanie.malin@colostate.edu (S.A. Malin).

¹ Office: 121 Giannini Hall, USA.

² Compared to an average of 6900 cubic feet/day produced by the second-place Eagle Ford Shale region.

³ Uneven state-by-state regulation allows for variable conditions in different states (Author, 2013; Boxerman et al., 2013).

Susquehanna welcome the economic boom associated with unconventional natural gas production. Yet these residents simultaneously contend with environmental risks and uncertainties and increasingly find themselves less able to independently determine their livelihoods and land use. Farmers in these rural regions often bridge two natural resource dependent economic sectors – unconventional natural gas and agricultural production – as both sectors utilize the same farmland for radically different land uses.

Some farmers with natural gas production on their land, particularly those who own their mineral rights, have been portrayed in popular media as “shale-ionaires”.⁴ They may sign lucrative leases allowing natural gas companies land and subsurface access. Without this access, the industry encounters barriers to the construction and installation of wellpads, storage facilities, and pipelines that transport natural gas to processing and trade hubs. Farmers who sign leases typically benefit financially from signing bonuses and/or royalties when natural gas is produced, particularly if their ownership rights extend beyond the surface to subsurface (mineral) rights. The initial financial benefits may be substantial, especially for mineral rights holders.⁵

However, the considerable focus on the financial benefits Pennsylvania farmers may experience can elide other critical social and environmental concerns, obscuring ways that the natural gas boom may place certain Pennsylvania farmers at risk. Within our case study analysis, we interviewed 36 farmers who manage small and/or midsized operations, 31 of whom owned their mineral rights.⁶ Our findings demonstrate that owning land and/or having mineral rights does not necessarily afford farmers of small and midsized operations decision-making power over how their land is used for natural gas production. Our findings also demonstrated that owning land and/or mineral rights fails to facilitate meaningful participation in the processes of negotiating and enforcing related lease terms. Moreover, these economically marginalized farmers can face increased exposure to various environmental risks upon entering into private agreements with the unconventional natural gas industry (Jacquet, 2014).

In Pennsylvania, small and midsized farm operations already contend with persistent economic marginalization (Bienkowski, 2015), unstable global markets, and increasing costs for agricultural land and other inputs. In counties like Bradford, Susquehanna, and Washington,⁷ for example, competition from large, consolidated, and vertically integrated agribusiness firms (particularly in sectors like dairy) renders small and midsized farm operations especially susceptible to market downturns (Adams and Kelsey, 2012). While natural gas production may mean an initial infusion of cash, we found that farmers experience environmental injustice and risk by becoming entrenched in a long-term web of

dependence between these two natural resource dependent industries. This intersectoral dependence may limit farmers' long-term decision-making agency, as well as their capacity to mitigate environmental risks.

The farmers in our study who owned small and midsized operations felt constrained to accommodate particular industry practices that often included increased exposure to myriad environmental risks and uncertainties. For operators of these farms, environmental risks – now increasingly documented across the US (see also: St. Fleur, 2015; Kelly, 2014) – include: public health impacts, such as increased rates of birth defects within a half mile of wellpads (McKenzie et al., 2014); water contamination, including loss of household water quality; harm to livestock (Mint Press News, 2015; Wilber, 2012); increased traffic, noise and light pollution (Brasier, 2014); decreased property values (Brasier et al., 2011; Cooley et al., 2012); inequitable and restricted access to information about chemicals used in unconventional production (Colborn, 2011); disturbed landscapes; and diminished quality of life (Perry, 2013; McKenzie et al., 2014).

Recent studies characterize the impacts from the disproportionate number of wells in Pennsylvania's poor communities – particularly on rural farmland in counties such as Bradford and Susquehanna – as examples of rural environmental injustice (Bienkowski, 2015; Ogneva-Himmelberger and Huang, 2015). Farmers we interviewed with small and midsized operations also reported experiencing corporate bullying and related disempowerment throughout the leasing and production processes and described the need to fight to receive promised royalty payments. These patterns align with journalistic investigations in which landowners reported similar experiences of procedural inequity (Kelly, 2014; Lustgarten, 2013).

To date, limited sociological research examines the relationships between rural environmental injustice and intersectoral natural resource dependence. Yet Pennsylvania Extension notes the need for more research, observing: “There is some association between Marcellus shale activity and dairy farming...and other types of farming...that requires further study and consideration,” beyond anecdotal assessments suggesting that all farmers have benefited from natural gas development during the current boom (Adams and Kelsey, 2012: 4). To address this research gap, we ask: What, if any, are the environmental justice implications of the unconventional natural gas industry's presence in rural agricultural spaces, particularly for farmers with small and midsized operations?

To examine this question, we draw upon a study we conducted with Pennsylvania farmers in 2012, utilizing findings from 42 in-depth interviews,⁸ participant observation, and archival analyses. We show how Pennsylvania farmers of small and midsized operations rely economically on the hydraulic fracturing boom. They leverage unconventional natural gas leases to supplement modest farm incomes and limited federal subsidies; alleviate debt and maintain their farm for their future generations; and/or to transition to less intensive forms of farming. Early in our study, we also interviewed owners of six larger farming operations, through the initial network sampling suggestions offered by key Pennsylvania State extension agents. These larger operators played important roles as gatekeepers by providing initial contacts with small and midsized farmers that were vital for this project. Yet it quickly became clear that their environmental justice experiences varied and that scholarly investigations of the experiences of small and

⁴ For example, see 60 Minutes' segment on them at: <http://www.cbsnews.com/videos/extra-meet-the-shaleionaires/>.

⁵ Mineral rights refer to owning some portion (or all) of the mineral wealth underground, typically below 300 feet. This division of surface and underground wealth is an historical arrangement, brokered between the federal government, states, and large industries like the rail sector. Unlike states like Colorado, where split estate dominates and means that surface and mineral rights are often severed, mineral rights ownership is much more common among Pennsylvania landholders like farmers. See <http://www.leg.mt.gov/content/publications/environmental/hb790brochure.pdf>.

⁶ We utilize estimates of farm size were informed in part by USDA characterizations of small and midsize farms in the region. These are defined for our study as farmers with less than 500 acres and/or 200 livestock. Large farmers have over 500 acres and/or more than 200 livestock.

⁷ These three counties encompass our study site, as described in the Methods section.

⁸ As described in Methods, 36 of these interviews were with small and midsized farmers, and six were conducted with Pennsylvania State Extension agents.

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