

Facing the true cost of fracking; social externalities and the role of integrated valuation



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ABSTRACT

This paper is based on a recent study that evaluated social externalities and examined how quality of life has been influenced by coal seam gas (CSG) projects in Southeast Queensland, Australia. CSG projects, also known as unconventional gas pose spatially extensive impacts on rural communities and tend to overlap other land uses, such as agriculture. This paper identifies key themes for evaluating social externalities of major resource projects using mixed-methods approach and structural equation modeling, and provides empirical evidence to support the multi-scale methodological framework for integrated valuation of ecosystem services.

The findings demonstrate alignment between cultural, economic and ecological value-domains and factors influencing quality of life and human wellbeing. The analysis shows that unresolved concerns of community residents about environmental and social impacts contribute to lower life-satisfaction and lead to a weaker local economy. This paper argues that integrated valuation of ecosystem services will not only improve project decision-making and planning, but also support efforts to minimize negative social externalities of major resource extraction projects.

1. Introduction

The predominately agricultural region of the Surat Basin in South-East Queensland, Australia has experienced a surge of industrial activity, itinerant workforce and rapid economic development as the result of four major coal seam gas/liquefied natural gas (CSG/LNG) projects starting in late 2006 and peaking between 2011 and 2014 (Queensland Government, 2014). CSG industry related activities in the region have placed significant pressure on the local economies. The crossover of these two competing industries, agriculture and CSG, has resulted in socio-economic, socio-institutional, socio-environmental and socio-cultural implications.

The Surat Basin is a geological basin that extends across an area of 270,000 square kilometers. Two thirds of the basin occupies a large part of Southeast Queensland, and the remainder is in northern New South Wales. The communities in this region are situated above the Great Artesian Basin, which underlies approximately 22% of Australia and is one of the largest underground water reservoirs in the world. The Great Artesian Basin provides the only reliable source of fresh water through much of inland Queensland (Habermehl, 2006). The communities affected by CSG operations included in this study are:

Dalby, Cecil Plains, Chinchilla, Miles, Tara, Condamine, Wandoan, Taroom, Roma, Injune and their surrounding districts. The study area is shown in Fig. 1.

The rapid economic development associated with the CSG industry has particularly placed significant pressure on the existing agricultural industry in the region. Due to the CSG and agricultural sectors sharing the same geographies, conflict over a variety of social, environmental and land usage-related issues have emerged. A significant area of irrigated farmland spread across the Surat Basin is dependent on the region's underground aquifers, in particular the Condamine Alluvium. The broader concerns of the agricultural community center on the long-term impacts of the CSG industry on groundwater, in particular: contamination, surface water disposal and drawdown (Makki, 2015).

To extract the gas from the coal seam, the process of hydraulic fracturing or fracking may be required. During the fracking process a mix of sand, water and chemicals is pumped at high pressure down the well and into the coal seam. This process creates a network of cracks in the coal, releasing the gas and water trapped inside (Lloyd-Smith and Senjen, 2011; Obo, 2015). Not all wells need to be fractured, in some cases the coal is permeable in other cases companies are required to drill horizontally into the coal seam as an alternative to fracturing.

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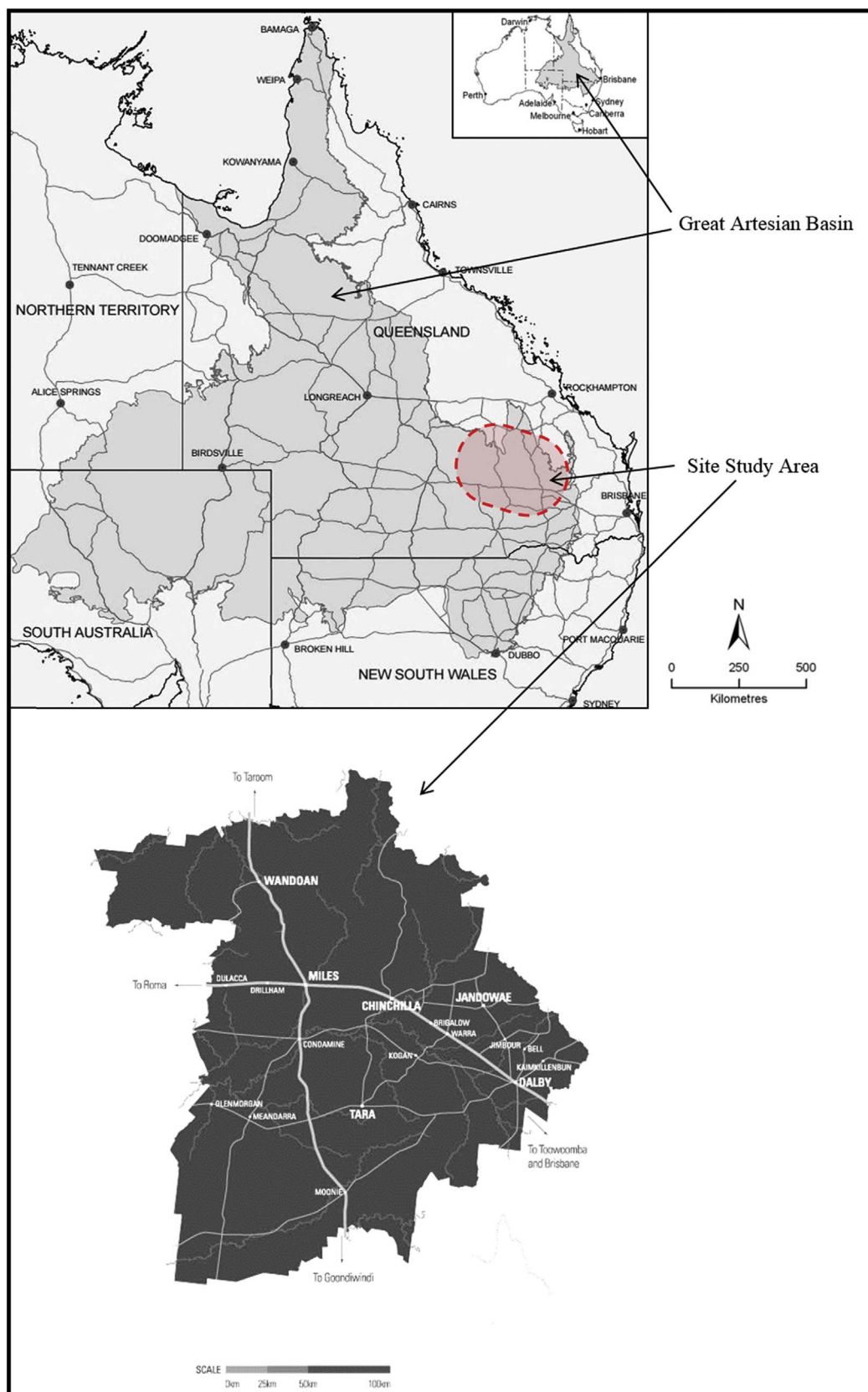


Fig. 1. Map of study area.

In order to increase the flow of gas, the process of CSG drilling extracts large volumes of groundwater, usually saline in nature, from the Walloon Coal Measures which are connected to the Condamine

Alluvium. As the result, CSG-induced depressurization is one of the major concerns for the agricultural communities in the region (Towler et al., 2016). Farmers are worried that the depressurizing of coal seams

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