Develop energy from shale with local ecosystems in mind

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In South Africa, there currently are plans to develop shale-based gas extraction in arid and semi-arid landscapes of the Karoo. The extraction of gas from shale in the Karoo through hydraulic fracturing, also known as 'fracking', remains a contentious issue, with stakeholders often criticised for not being forthright in their reporting of the possible risks to local water resources.[1] Indeed, what I find the most striking among all the debate and polemical essays is how very few scientific reports there are on the possible local effects of fracking on the native Karoo biota.

A recent review underscored this shortfall in hydraulic fracturing development globally.[2] The authors concluded that energy development from shale gas often suffers from being ambiguous and incomprehensive across space: far too few peer-reviewed research papers particularly address the impact that fracking might have on the *biotic* elements in the landscape. This review therefore addresses the much-needed emphasis on including biodiversity conservation in assessing a fracking-targeted landscape.

A lack of focus from shale gas energy developers with regard to local biodiversity in the Karoo landscape would be naïve for two reasons. Firstly, it is generally accepted that intact ecosystems provide the necessary goods and services to sustain a society.[3] Secondly, considering that the Karoo is also a dryland ecosystem, it is important to note that there is a global pattern indicating dryland plant species richness as strongly related to sustainable dryland ecosystem function.[4] Thus, the appropriate management of biota in the landscape would ensure a sufficient buffer against environmental threats such as climate change and desertification.[4]

In view of the above, the findings by Souther et al.[2] should function as a stark wake-up call to all stakeholders of shale gas energy development in the Karoo; the locally targeted ecosystem needs to be considered in full to ensure cognisance of the realised impacts of fracking on the whole ecosystem. This biotic focus is especially relevant for the South African Karoo region because the method in question is directly threatening an already water-limited environment.

It is shortsighted to review the potential for shale gas development in South Africa and disregard the biotic influences when considering the vagaries of the successes and impact of fracking globally (see also Inman[5]). It would also be in direct contrast to the character of science as serving the whole community.

What biotic sacrifices are we about to make to extract shale gas energy? I believe more people would be at peace with the matter if they had access to more locally relevant scientific evidence – across all hierarchies of needs.

Photo: CJ Crous

Figure 1: A Karoo landscape near Prince Albert, showing the structural (topographical) and functional diversity (e.g. hill and riverine areas). This diversity increases and sustains biodiversity and ensures critical ecosystem functioning. What would the surface effects of shale gas extraction be on this pristine yet complex environment?

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