Correspondence

Assess benefits and costs of shale energy

The United States and Canada are already extracting fossil fuels from shale formations by fracking, and the industry is expanding rapidly into Australia, Asia, South America and Europe. Whereas conventional energy-production sites tend to cause mainly local impacts, the wide spatial footprint of shale-energy extraction means that many more people will be affected as such sites are established.

We estimate that around 300 million people across 6 continents occupy land overlying shale-energy reservoirs (see 'Socio-economic impacts of shale energy'). This figure is based on shale gas and oil basins identified by the US Energy Information Administration (see go.nature.com/tgsmsv) and on settlement data. Large-scale industrial extraction sites are likely to have socio-economic consequences for all these people.

These effects could be benefits or costs, depending on how they play out. Examples include positive or negative changes to income, employment and housing costs for individuals. For communities, there could be impacts on population growth, youth migration, income distribution, the aesthetic appeal of the landscape and service provision. Extraction sites could also alter the economic productivity of host areas, for example because of competition for land use or the energy sector's high wages.

Tackling these factors fairly will be a challenge to policy-makers, who need to realize the benefits of shale-energy technology to communities. They also have to offset potential losses, including setting appropriate compensation.

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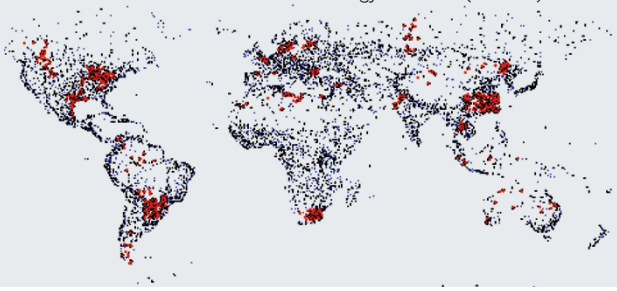
SOCIO-ECONOMIC IMPACTS OF SHALE ENERGY

Of all humans in populated areas (dark blue dots) across the globe, some 300 million live above known shale-energy reservoirs (red dots).



DATA SOURCES: NATURALEARTHDATA.COM/EIA

Maize is not a clue to Puerto Rican origins

You discuss the implications of the unpublished discovery of DNA from maize (corn) in ancient faeces from two pre-Columbian cultures on Vieques Island, Puerto Rico (*Nature* http://doi.org/s8g; 2014). We question the inference from this discovery that one culture, the Huecoid people, originated from the Bolivian Andes.

That inference is presumably based on the assumption that maize and chicha (a fermented maize beverage) were produced in Bolivia. However, both items were widely used throughout pre-Columbian America during Huecoid times in 400 BC to AD 600 (see, for example, R. M. Bonzani and A. Oyuela-Caycedo in *Histories of Maize* 343–356; Academic Press, 2006). Maize was also already present among pre-Arawak Antillean groups by 2950 BC and, contrary to your speculations, was not introduced into Puerto Rico by the Huecoid people (see J. R. Pagán-Jiménez in *The Oxford Handbook of Caribbean Archaeology* 391–406; Oxford Univ. Press, 2013).

The archaeological evidence of early Caribbean societies therefore indicates that Puerto Rican natives may have had earlier and more wide-ranging origins than your report implies (see also R. Rodríguez-Ramos *Rethinking Puerto Rican Precolonial History;* Univ. Alabama Press, 2010).

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Greek science must reform to survive

Greece's progress in science was remarkable in the decade before the country's severe economic downturn at the end of 2008. Although subsequent research output has been sustained against the odds, prompt and coordinated action is now needed to avert a crisis.

During 1999–2009, the proportion of papers published worldwide that included at least one Greek author rose from 0.43% to 0.76%, and Greece moved up from 31st to 24th in the global ranking of annual publications (data from Scopus, derived using SCImago; www.scimagojr.com). At the peak of its research output in 2009, Greece had a greater scientific output per capita than France, Italy or Japan — despite the Greek government's record of under-investment in research.

Because Greece's research budget has since fallen behind that of the rest of Europe, this peak has become a plateau — unlike in almost all other European Union countries, where publication output is rising. Hiring of staff has ceased and researchers' salary cuts are killing competitiveness and leading to a mass exodus to foreign labs.

To avoid a descent back to last century's rankings, it is vital that Greece uses its resources creatively and efficiently by instigating essential structural reforms, including a national science plan, evaluation of funding allocation, and university restructuring. It should also encourage stronger cooperation among national research centres and more international collaboration.

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Update German view of genetic testing

There has been scant public discussion about genetic screening of embryos in Germany, presumably because of a residual suspicion of genetic diagnostics after the sinister history of Nazi eugenics. To rectify this and to remove ideological preconceptions, the Leopoldina, Germany's national academy of sciences, set up an interdisciplinary panel of experts last year to discuss the ethical implications of genetic diagnostics (see go.nature.com/gzmhpe; in German).

The panel agreed that adequate genetic counselling is paramount, that personal freedom and human dignity must be preserved, and that a third party should not be allowed to decide the fate of an embryo that tests positive for a severe genetic disease.

The panel's main concerns were to find the best ways to safeguard the voluntary decisions of couples to undergo and act on genetic testing of their unborn child, and to protect the rights of tested and untested children born with a genetic disease.

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