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REVIEWS

Global challenges

GENETICS

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through genetic changeMore than just repression
Epigenetics uncovers the other
side of DNA methylation

► COVER: 'Terra incognita' by Patrick Morgan.



LOUISA FLINTOFT



TANITA CASCI



PATRICK GOYMER

Our planet is facing challenges that, if left unaddressed, are predicted to cause untold damage on a global scale. Environmental change is threatening ecosystems and food production, particularly in developing countries, a problem that is exacerbated by the increasing expansion of the human population. And even as industrialized nations begin to tackle their addiction to fossil fuels, their use is rapidly increasing in countries that are undergoing economic growth. This focus issue of *Nature Reviews Genetics* explores the contribution that genetics can make in tackling these global challenges.

One promising application of genetics is monitoring the effects of changing environments on biodiversity. On page 421, Hoffmann and Willi discuss how genetic markers can be used to do this in an increasing number of species. Basic and applied plant genetics also have much to offer. As discussed by Takeda and Matsuoka on page 444, and in the Research Highlights on pages 414 and 415, our understanding of the genetic determinants of crop yield and plant resistance to stresses is expanding. These insights promise a route to getting reliable food supplies from increasingly difficult growing conditions. Similarly, a combination of genetic engineering and a detailed exploration of basic plant biology has great potential for the production of affordable biofuels, as discussed by Mariam Sticklen on page 443.

But potential scientific solutions must be assessed in a broader context. On page 458, Ronald Herring explores the complex reasons why transgenic crops are still far from universally accepted, and the impact that this could have on delivering the benefits of such crops to those who need them most.

As usual, this focus issue is accompanied by a web focus (<http://www.nature.com/nrg/focus/globalchallenges>), a collection of relevant articles from Nature Publishing Group.

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