Dangerous climate change and global food security

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O'Neill and Oppenheimer ("Dangerous climate impacts and the Kyoto Protocol," Policy Forum, 14 June, p 1971) suggest, as plausible thresholds for dangerous climate change, the large-scale eradication of charismatic ecosystems or a major discontinuity to the climate system. Another threshold may serve even better to focus policy makers on avoiding danger. This is the possibility that future climate change may cause regional food insecurity in heavily armed but politically unstable regions, of sufficient magnitude to risk adverse military, economic and terrorism consequences that could be global in scale.[1,2]

Most projections of future global food security either ignore the impact of climate change[3] or conclude that the gains in crop yields, as a result of CO_2 fertilization and the release of new areas suitable for crop production, will at least offset any losses. Models produced by the Hadley Center and the Max Planck Institute predict regional declines in food production at low latitudes, especially in the Indian subcontinent and sub-Saharan Africa,[4,5] but compensatory increases in North Asia and Canada.

It will be problematic to satisfy the future demand for food in regions whose high population density in the middle of this century may reflect the agricultural abundance of earlier decades. To meet such demand would require a seamless climatic transition, whereby the increased agricultural capacity at high latitudes is in temporal harmony with the decline at lower latitudes. Further, this scenario assumes that the soil ecosystems at high latitudes will be suitable for large-scale cropping. Most problematic, given that large-scale migration is likely to be (increasingly) restricted, is the assumption that the increasingly hungry and poor populations adversely affected by climate change will be able to stimulate and reward the capital investment required to develop these agriculturally virgin lands.

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References

1. J. Lash, *Science* **294**, 1789 (2001).
2. D. Kennedy, *Science* **295**, 405 (2002).
3. N. Alexandratos, World food and agriculture: Outlook for the medium and longer term. *Proc. Nat. Acad. Sci*, **96**, 5908-5914 (1999).
4. G. Fischer, M. Shah, H. van Velthuizen, F.O. Nachtergaele, *Global agro-ecological assessment for agriculture in the 21st Century* (International Institute of Applied Systems Analysis (2001). (available at http://www.iiasa.ac.at/Admin/INF/recent-pubs/gaea/).
5. M.L. Parry, C. Rosenzweig, A. Iglesias, G. Fischer, M. Livermore. Climate change and world food security: a new assessment. *Glob. Env. Change;* **9** (Supplemental Issue)**:** s51-s67 (1999).