CHAPTER 1. PUSHING BEYOND THE EARTH’S LIMITS


Notes

Notes: Chapter 1


27. Grain database at USDA, op. cit. note 5.

28. Figure 1–3 compiled from USDA, op. cit. note 5; Japan multiple cropping index from Ministry of Agriculture, Forestry, and Fisheries, *Statistical Yearbook of Agriculture, Forestry, and Fisheries* (Tokyo: various years).

29. USDA, op. cit. note 5.

30. Ibid.

31. United Nations, op. cit. note 1; IMF, op. cit. note 2; Postel, op. cit. note 21.


33. USDA, op. cit. note 5.

34. Ibid.


37. USDA, op. cit. note 5.


41. Lester R. Brown, “China Losing War With Advancing Deserts,” *Eco-Economy Update* (Washington, DC: Earth Policy Institute, 5 August 2003); Wang Tao, Cold and Arid Regions Environmental and Engineering Research Institute, China, e-mail to author, 5 April 2004.

42. “State Raises Rice Prices,” op. cit. note 36.

43. USDA, op. cit. note 5.

44. United Nations, op. cit. note 1.


48. United Nations, op. cit. note 1; USDA, op. cit. note 5.

49. USDA, op. cit. note 5.

50. United Nations, op. cit. note 1; USDA, op. cit. note 5.

51. USDA, op. cit. note 5.


23. Ibid.


CHAPTER 3. MOVING UP THE FOOD CHAIN EFFICIENTLY

1. For data on meat production in various countries, see U.N. Food and Agriculture Organization (FAO), FAOSTAT Statistics Database, at apps.fao.org, updated 24 May 2004.


3. Figure 3–1 compiled from FAO, op. cit. note 1, and from historical statistics in Worldwatch Institute, Signposts 2002, CD-Rom (Washington, DC: 2002); average per capita consumption from FAO, op. cit. note 1, and from population in United Nations, World Population Prospects: The 2002 Revision (New York: 2003).


5. USDA, op. cit. note 4; United Nations, op. cit. note 3.


8. Figure 3–2 compiled from FAO, op. cit. note 1, and from Worldwatch Institute, op. cit. note 3.


10. FAO, op. cit. note 1; USDA, op. cit. note 4.

11. FAO, op. cit. note 1.


13. Table 3–1 compiled from FAO, op. cit. note 1, and from FAO, op. cit. note 7.


18. Figure 3–3 compiled from FAO, op. cit. note 1, from FAO, op. cit. note 7, and from Worldwatch Institute, op. cit. note 3; United Nations, op. cit. note 3.


25. FAO, op. cit. note 1; Worldwatch Institute, op. cit. note 3.
27. Author’s calculations based on USDA, op. cit. note 4, and USDA, Foreign Agricultural Service (FAS), miscellaneous agricultural reports (Washington, DC: various years).
28. USDA, op. cit. note 4.
29. Ibid.
31. USDA, op. cit. note 4.
32. Ibid.; Worldwatch Institute, op. cit. note 3.
34. USDA, op. cit. note 4.
37. USDA, op. cit. note 4; Worldwatch Institute, op. cit. note 3.
38. USDA, op. cit. note 4.
39. Figure 3–4 compiled from FAO, op. cit. note 1.
41. Milk consumption from FAO, op. cit. note 1; United Nations, op. cit. note 3.
42. Banerjee, op. cit. note 40; Dhall and Dhall, op. cit. note 40.
46. FAO, op. cit. note 1; FAO, op. cit. note 7.
47. United Nations, op. cit. note 3; FAO, op. cit. note 1.
49. Figure 3–6 compiled from FAO, op. cit. note 1.
CHAPTER 4. RAISING THE EARTH’S PRODUCTIVITY


3. USDA, op. cit. note 1.


8. Evans, op. cit. note 7.

23. Figure 4–3 compiled from FAO, op. cit. note 13, updated 2 July 2004, and from Worldwatch Institute, op. cit. note 18.


25. Fertilizer from Heffer, op. cit. note 18 and from IFA Secretariat and IFA Fertilizer Demand Working Group, op. cit. note 18; irrigation from FAO, op. cit. note 13, updated 2 July 2004.

26. USDA, op. cit. note 1; Heffer, op. cit. note 18; IFA Secretariat and IFA Fertilizer Demand Working Group, op. cit. note 18.


28. Table 4–2 from USDA, op. cit. note 1; Worldwatch Institute, op. cit. note 1.

29. Figure 4–4 compiled from USDA, op. cit. note 1; monsoon weather from USDA, FAS, Grains: World Markets and Trade (Washington, DC: various years).

30. USDA, op. cit. note 1; USDA, op. cit. note 29.

31. USDA, op. cit. note 1.

32. Figure 4–5 compiled from ibid.; France from FAO, op. cit. note 13.

33. Figure 4–6 compiled from USDA, op. cit. note 1; information on China’s double cropping in W. Hunter Colby et al., Agricultural Statistics of the People’s Republic of China, 1949–1990 (Washington, DC: USDA, ERS, 1992), and in USDA, FAS, “Crop Calendar,” at www.fas.usda.gov/pecad/weather/Crop_calendar/crop_cal.pdf.


36. Ibid.


39. Ibid., p. 328.

40. Ibid.

41. Ibid., pp. 327–29.

42. Sinclair, op. cit. note 5; Cassman et al., op. cit. note 35.

43. Sinclair, op. cit. note 5; Cassman et al., op. cit. note 35.

44. Sinclair, op. cit. note 5.

45. Kenneth Cassman, Professor and Head of Department of Agronomy and Horticulture, University of Nebraska, letter to author, 7 May 2004.

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47. Brown, op. cit. note 24, p. 61.


50. Jules Pretty and Rachel Hine, “Reducing Food Poverty with


52. Pretty and Hine, op. cit. note 30, p. 21.

CHAPTER 5. PROTECTING CROPLAND


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25. United Nations, op. cit. note 5; land requirements are author’s estimate.


27. United Nations, op. cit. note 5.

28. Figure 5–1 from Worldwatch Institute, Signposts 2004, CD-Rom (Washington, DC: 2004); calculations for paved area by Larsen, op. cit. note 4.

29. Vehicle fleet from Ward’s Communications, op. cit. note 4; population from United Nations, op. cit. note 5; grain from USDA, op. cit. note 10.


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32. Worldwatch Institute, op. cit. note 28; Ward’s Communications, op. cit. note 4.


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41. Ibid.


43. United Nations, op. cit. note 5.

CHAPTER 6. STABILIZING WATER TABLES


3. Ibid.


5. U.S. water depletion from USDA, Agricultural Resources and Environmental Indicators 2000, op. cit. note 4, p. 6; India water depletion from Shah et al., op. cit. note 4, and from Seckler, Molden, and Barker, op. cit. note 4; North China Plain from Ma, op. cit. note 4; share of China’s grain harvest from the North China Plain based on Yang and Zehnder, op. cit. note 4, and on USDA, Production, Supply, and Distribution, op. cit. note 4.

6. Ogallala aquifer information from “High Plains Aquifer Down by Six Percent,” op. cit. note 4, from USGS, op. cit. note 4, and from USDA, Agricultural Resources and Environmental Indicators 2000, op. cit. note 4; Saudi Arabia aquifer information from Smith, op. cit. note 4; deep North China Plain aquifer information from Ma, op. cit. note 4.

7. Figure 6–1 compiled from USDA, Production, Supply, and Distribution, op. cit. note 4.

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30. Nile River flow from Postel, op. cit. note 13; grain imports from USDA, Production, Supply, and Distribution, op. cit. note 4; calculation based on 1,000 tons of water for 1 ton of grain from FAO, op. cit. note 1.


32. Calculation based on 1,000 tons of water for 1 ton of grain from FAO, op. cit. note 1.


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37. Table 6–3 from Postel and Vickers, op. cit. note 33, p. 53.


41. USDA, Production, Supply, and Distribution, op. cit. note 4.

42. Population from United Nations, op. cit. note 4; grain consumption from USDA, Production, Supply, and Distribution, op. cit. note 4; water calculation based on 1,000 tons of water for 1 ton of grain from FAO, op. cit. note 1.


CHAPTER 7. STABILIZING CLIMATE


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32. Author’s estimate.
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38. USDA, op. cit. note 1.
39. Figure 8–3 from ibid.
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**CHAPTER 9. THE BRAZILIAN DILEMMA**

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13. Figure 9–3 compiled from ibid.

14. Figure 9–4 compiled from ibid.

15. Schnepf, Dohlman, and Bolling, op. cit. note 10, p. 37; USDA, op. cit. note 1.


38. FAO, op. cit. note 5.
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