

Contents

Executive Summary	iii
1. Old Concerns and New Opportunities	1
Biophysical processes and economic choices	2
Farmers' incentives	3
Policy challenges	6
New contributions in data and analysis	7
2. Trends in Food and Resources	8
World food demand	8
World food supply	8
Cropland area	9
Yields	10
Land quality	12
Land degradation	15
Productivity impacts of land degradation – evidence to date	17
3. Land Quality and Agricultural Productivity	19
Previous production-function analyses	20
New land quality indicators	20
New econometric analyses	22
Total factor productivity analysis	26
Data envelopment analysis	26
4. Land Degradation and Agricultural Productivity	28
Evidence from plot-level studies	28
Extrapolation using GIS data on land cover and erosion vulnerability	31
Annual losses in yields and production	32
Lessons from plot-level studies	32
5. Farmer Responses to Land Degradation	35
Farmers' incentives and choices	35
Soil fertility management and erosion control in a dynamic context	35
Land tenure and the adoption of conservation practices in the United States	39
Adoption of conservation practices in other countries	41
6. Land Degradation and Food Security	43
Baseline estimates from ERS and IFPRI models	43
Alternative scenarios	44
Implications and extensions	48
7. Challenges for Research and Policy	49
Improving spatially referenced data on resources and farm practices	50
Incorporating simultaneity in analysis of resources and farm practices	50
Improving R&D to address the needs of resource-constrained farmers and areas	50
Improving policy and institutions to do likewise	51
References	52