

HANDBOOK OF AGRICULTURAL ECONOMICS

VOLUME 2A AGRICULTURE AND ITS EXTERNAL LINKAGES

Edited by

BRUCE L. GARDNER

University of Maryland, College Park

and

GORDON C. RAUSSER

University of California, Berkeley



2002

ELSEVIER

AMSTERDAM · BOSTON · LONDON · NEW YORK · OXFORD · PARIS SAN DIEGO · SAN FRANCISCO · SINGAPORE · SYDNEY · TOKYO

CONTENTS OF VOLUME 2A

Introduction to the Series	v
Contents of the Handbook	vii
Introduction	xi
PART 3 – AGRICULTURE, NATURAL RESOURCES	
AND THE ENVIRONMENT	
Chapter 22	
The Economics of Agriculture in Developing Countries: The Role of the	
Environment	
RAMÓN LÓPEZ	1213
Abstract	1214
Keywords	1214
1. Agriculture and the environment with fixed institutions	1218
1.1. Open access agriculture	1219
1.2. Common property with restricted access	1221
1.3. Private property	1224
1.4. Economic growth and natural capital with fixed institutions	1227
2. Endogenous institutions	1228
2.1. Market incentives and communal institutions	1229
2.2. Privatization	1231
3. Conclusion	1233
Technical Appendix. Two-sector endogenous growth model of a small open	
economy	1234
References	1244
Chapter 23	
Agriculture and the Environment	
ERIK LICHTENBERG	1249
Abstract	1250
Keywords	1250
1. Introduction	1251
2. Agriculture, stewardship, and the environment	1252
2.1. Agriculture and environment: theory	1252
2.2. Stewardship incentives in agriculture	1255
2.3. Agriculture and the environment: empirical evidence	1260

3.	Heterogeneity	1262
	3.1. Efficiency of alternative policies in a heterogeneous industry	1264
	3.2. Heterogeneity and implementability	1272
4.	Uncertainty	1282
	4.1. Taxes, subsidies, and best practice standards under uncertainty	1282
	4.2. Regulatory aversion to uncertainty	1288
	4.3. Information acquisition: IPM and precision agriculture	1290
5.	Interactions among agricultural, resource, and environmental policies	1295
	5.1. Agricultural price and income policies	1296
	5.2. Price stabilization and crop insurance	1299
	5.3. Input subsidies	1300
6.	Concluding remarks	1302
	knowledgements	1 3 Q4
	erences	1305
Cho	apter 24	
	nmon-Pool Resources and Institutions: Toward a Revised Theory	
	NOR OSTROM	1315
Abs	stract	1316
Key	vwords	1316
-	Introduction	1317
2.	The conventional theory of common-pool resources	1318
	A common-pool resource in the laboratory	1318
	3.1. Communication in the laboratory	1319
	3.2. Monitoring and sanctioning in the laboratory	1321
4.	Common-pool resources in the field	1323
	On the origin of self-governed common-pool resources	1324
	On the design principles of robust, self-governed common-pool resource	
	institutions	1330
7.	Theoretical puzzles	1333
	7.1. Size of group	1333
	7.2. Heterogeneity	1334
8.	Conclusion	1335
	erences	1336
Che	apter 25	
	riculture and Ecosystem Services	
-	OFFREY M. HEAL and ARTHUR A. SMALL	1341
Ab	stract	1342
Ke	ywords	1342
	Agriculture and global environmental change	1343
	1.1. Organization of the chapter	1346
2.	Agriculture and ecosystem services: a brief overview	1347
	•	

Contents of Volume 2A xvii

3.	A conceptual framework for the economics of agriculture and ecosystem	
	services	1349
4.	Integrating ecosystem services into production economics	1352
	4.1. Ecological production theory	1352
	4.2. Methods for studying agro-ecosystems	1356
	4.3. Interactions between agricultural economics and ecology	1358
5.	Institutions and ecosystem services	1359
	5.1. The policy problem posed by ecosystem services	1359
	5.2. Correcting externalities and supporting public goods - incentives for the provision of	
	ecosystem services	1361
	5.3. Additional issues of institutional design	1364
6.	Reprise, and directions forward	1365
Acl	knowledgements	1367
Ref	rerences	1368
DA I	RT 4 – AGRICULTURE IN THE MACROECONOMY	
ΓÆJ	NI 4 - AGRICULTURE IN THE MACROECONOMI	
Che	apter 26	
App	plied General Equilibrium Analysis of Agricultural and Resource Policies	
TH	OMAS W. HERTEL	1373
Ab	stract	1374
Key	ywords	1374
1.	Introduction	1375
2.	Why applied general equilibrium analysis of agriculture?	1376
	2.1. Benefits of AGE analysis	1376
	2.2. Hidden challenges to AGE analysis	1380
3.	Data and aggregation issues: How detailed should the model be?	1382
	3.1. Sectoral and commodity disaggregation	1382
	3.2. Household disaggregation	1384
	3.3. Regional disaggregation	1384
	3.4. Agriculture as a multiproduct industry	1386
	3.5. Producer heterogeneity	1386
	3.6. Establishing an appropriate benchmark	1388
	3.7. Treatment of land in AGE models	1389
	3.8. The role of water	1391
4.	Parameter specification and model closure	1391
	4.1. Specification of preferences and technology	1391
	4.2. Short, medium, or long run?	1395
	4.3. Supply response	1397
	4.4. Model closure	1398
	4.5. Equilibrium demand elasticities	1399
	4.6. Systematic sensitivity analysis	1399

5. Modeling policies that affect agriculture	1400
5.1. Modeling voluntary participation	1400
5.2. Interventions in the processed product markets	1401
5.3. Agricultural policies in a changing world economy	1401
5.4. Political economy of policies: General equilibrium dimensions	1402
6. Agriculture and the environment	1403
7. Product differentiation and imperfect competition	1404
8. Model validation	1406
9. Conclusions	1407
Acknowledgements	1411
References	1411
Chapter 27	
Agriculture and the Macroeconomy, with Emphasis on Developing Countries	•
MAURICE SCHIFF and ALBERTO VALDÉS	1421
Abstract	1422
Keywords	1422
1. Introduction	1423
2. Development strategies in the South after World War II: A historical	
perspective	1424
3. The macroeconomic environment and agricultural price incentives	1427
3.1. The real exchange rate	1428
3.2. Policy-induced effects	1431
3.3. Exogenous effects including Dutch disease	1440
3.4. Interest rates	1443
3.5. Structural adjustment	1445
4. The North	1446
4.1. The United States	. 1446
4.2. The European Union and its common agricultural policy	1448
4.3. Japan and New Zealand	1449
5. Concluding comments	1449
Acknowledgements	1451
References	1451
Chapter 28	٠,
The Macroeconomics of Agriculture	
PIER GIORGIO ARDENI and JOHN FREEBAIRN	1455
Abstract	1456
Keywords	1456
1. Introduction	1457
2. Inter-sector linkages	1459
2.1. Agriculture to the general economy (backward linkages)	1459
2.2. General economy to agriculture (forward linkages)	1461
2.3. Feedback effects	1470

Contents of Volume 2A xix

3. Quantitative studies and the empirical evidence	1470
3.1. Structural models	1470
3.2. Computable general equilibrium models	1473
3.3. Time-series studies	1474
4. Assessment	1480
Acknowledgements	1480
References	1480
Chapter 29	
Agriculture and Economic Development	
C. PETER TIMMER	1487
Abstract	1488
Keywords	1488
1. Introduction	1489
2. Modeling the role of agriculture in economic development	1491
3. The rural economy and growth in the macro economy: Specifying the	
mechanisms	1495
3.1. Urban bias and economic growth	1497
3.2. Agricultural productivity and nutritional status of workers	1502
4. Food security, food price stability, and economic growth	1506
4.1. The macroeconomic impact of stabilizing food prices	1507
4.2. Empirical evidence relating price instability and economic growth	1508
5. The early debate on the role of agriculture – origins of discrimination	1510
6. Agricultural decision making and the role of market signals	1514
7. The role of the state – evolution of the debate	1515
8. The policy issues	1518
8.1. The macroeconomic environment and agriculture	1518
8.2. Agricultural technology	1518
8.3. Rural infrastructure	1520
9. Agriculture and poverty alleviation	1524
9.1. The statistical approach	1527
9.2. The impact of income distribution on the distribution of growth	1529
9.3. The "elasticity of connection" from agriculture and non-agriculture	1530
10. Insights on the political economy of growth	1534
Appendix A. Definitions of variables used in regressions	1536
Appendix B	1537
B.1. Means and standard deviations of variables when GRSH5 is the dependent variable	1537
B.2. Means and standard deviations of variables when GRNAGSH5 is the dependent variable	1537
Appendix C. List of countries in samples	1538
Appendix D	1539
D.1. Panel data set of rural human capital (average years of education per person over the age	
of 25)	1539

ХX

D.2. Panel data set of non-rural human capital (average years of education per person over the age of 25)	.1540
Acknowledgements	1542
References	1542
Chapter 30	
The Rural Sector in Transition Economies	
KAREN BROOKS and JOHN NASH	1547
Abstract	1548
Keywords	1548
1. Introduction: From isolation to integration in Eastern and Central Europe and	
Central Asia	1549
2. The legacy of the plan	1552
3. The agenda of transition	1563
3.1. Land and farms	1563
3.2. Rural finance	1568
3.3. Reforms of price policy and trade	1571
3:4. Privatization	1576
3.5. Legal and regulatory reform	1581
3.6. Public goods and services	1583
4. Outcomes and prospects	1584
Acknowledgements	1587
References	1587
Chapter 31	
Rural Development and Rural Policy	
ALAIN DE JANVRY, ELISABETH SADOULET and RINKU MURGAI	1593
Abstract	1594
Keywords	1595
Agricultural economics and rural economics	1596
2. Why the need for a rural policy?	1598
2.1. The less developed countries	1598
2.2. The more developed countries	1599
3. Approaches to rural development in a historical perspective	1600
3.1. From World War II to 1980: Role of the state in rural development	1601
3.2. The 1980s: Restoring the role of the market	1604
4. The 1990s: New context for rural development	1605
4.1. Role of the market	1605
4.2. Role of the state	1606
4.3. Role of civil society	1611
5. Modeling household responses	1615
5.1. Static household behavior under market imperfections	1615
5.2. Dynamia household models. Asset accumulation and evalution of caretien etructure	1622

6. Modeling agrarian institutions: Informal finance	1632
6.1. Formal and community-based finance: Limitations and comparative advantages	1633
6.2. The theory of group lending: Peer selection, peer monitoring, and mutual insurance	1633
6.3. Evidence on the importance and impact of group-lending programs	1637
6.4. Lessons for institutional building for rural development	1639
7. Community relations and behavior	1643
8. Regional linkages and endogenous growth	1645
9. Conclusions: Toward a new approach to rural development	1646
References	1650
Chapter 32	
Agriculture in the Macroeconomy: Theory and Measurement	
PHILIP ABBOTT and ALEX McCALLA	1659
Abstract	1660
Keywords	1660
1. Introduction	1661
2. Agriculture's structural transformation	1664
3. Agriculture in the macroeconomy	1669
4. Missing issues	1675
5. Theoretical basis for examining agriculture's role/methodologies employed	1678
6. Empirical issues and limitations	1680
7. Conclusion	1681
References	1683
Author Index	I-1
Subject Index	I-33