

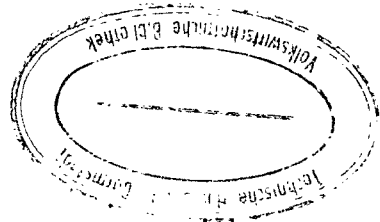
Evolutionary Dynamics and Sustainable Development

A Systems Approach

Norman Clark
SPRU, University of Sussex, UK

Francisco Perez-Trejo
UNITAR, Geneva, Switzerland

Peter Allen
IERC, Cranfield University, UK



Edward Elgar
Aldershot, UK – Brookfield, US

Contents

<i>List of Tables</i>	<i>ix</i>
<i>List of Figures</i>	<i>xi</i>
<i>Preface</i>	<i>xiii</i>
1. Modelling Sustainable Development	1
1.1 Introduction	1
1.2 Economic Models	7
1.3 Development Models	10
1.4 Spatial Development and the Environment	13
1.5 The Scientific Method	15
1.6 Layout	16
2. The Nature of Systems	19
2.1 Introduction	19
2.2 Open and Closed Systems	20
2.3 Living Systems	21
2.4 Resilience and Stability	22
2.5 Classification of Systems	25
2.6 System Evolution	28
2.7 The Evolutionary Drive	30
2.8 Complexity	36
2.9 The Scientific Method	41
2.10 Conclusion and Summary	44
3. Economic Systems	46
3.1 Introduction	46
3.2 Economic Analysis	47
3.3 Economic Systems as Complex Systems	52
3.4 Technological Systems and Evolutionary Behaviour	57
3.5 Some Recent Issues	61
3.6 Modelling Evolutionary Change	65
3.7 Conclusions	66

4. Spatial Modelling	69
4.1 Introduction	69
4.2 Planning and Systemic Knowledge	70
4.3 The Senegal Model	75
4.4 Evaluation	84
4.5 Some Concluding Remarks	86
5. The Model as a Decision Tool (A Crete Case Study)	88
5.1 Introduction	88
5.2 Desertification in the Mediterranean Basin	89
5.3 The Crete Model	92
5.4 Scenario Development (Tourism)	95
5.5 Risk Analysis	103
5.6 Employment Forecasts	104
5.7 The Natural System	106
5.8 Some Concluding Points	108
6. An Agenda for the Future	110
6.1 Introduction	110
6.2 The Nature of Knowledge	111
6.3 Enfranchising the Stakeholder	118
6.4 Endogenising the Environment	120
6.5 The Model as a Training Methodology	121
6.6 The Equations	123
6.7 System Dynamics	125
6.8 Policy and Policy Analysis	127
6.9 Conclusions	129
Appendix I An Exploration of Complex Economic Systems	132
Modelling for Strategic Planning	
AI.1 Introduction	132
AI.2 Modelling Framework	133
AI.3 The Core Simulation Model	135
AI.4 Application: Strategic Planning for Senegal	141
Appendix II VENSIM: A Modelling Environment	144
AII.1 Introduction	144
AII.2 The Modelling Environment	145
AII.3 Building a Model in VENSIM	148
AII.4 Modelling Examples	151
AII.5 Some General Conclusions	155
<i>References</i>	157