

Contents

<i>List of Figures</i>	viii	
<i>List of Tables</i>	ix	
<i>List of Variables</i>	x	
<i>List of Abbreviations and Acronyms</i>	xii	
<i>Preface to the Third Edition</i>	xiv	
1	INTRODUCTION AND OVERVIEW	1
2	SUSTAINABLE DEVELOPMENT: CONCEPTUAL, ETHICAL AND PARADIGMATIC ISSUES	7
2.1	Definitions, assumptions, methodology	7
2.2	The ethics of sustainable development	13
2.2.1	Reasons for committing to sustainable development	14
2.2.2	The time-inconsistency problem of sustainable development	16
2.2.3	Two misunderstandings about sustainable development resolved	17
2.3	Weak versus strong sustainability	20
2.3.1	The paradigm of weak sustainability	21
2.3.2	The paradigm of strong sustainability	23
2.4	The importance of the substitutability assumption: the case of climate change	27
2.4.1	The Nordhaus approach towards climate change	29
2.4.2	Critique of the Nordhaus approach (I): discounting the future	32
2.4.3	Critique of the Nordhaus approach (II): substitutability of natural capital	37
2.4.4	The real controversy	41
2.5	Conclusion	42
3	RESOURCES, THE ENVIRONMENT AND ECONOMIC GROWTH: IS NATURAL CAPITAL SUBSTITUTABLE?	45
3.1	A short history of resource and environmental concern	46
3.2	Resource availability	48
3.2.1	Substitution with other resources	49
3.2.2	The role of prices in overcoming resource constraints	53
3.2.3	Substitution with man-made capital	62

3.2.4	Technical progress	70
3.3	Environmental degradation	74
3.3.1	Can future generations be compensated for long-term environmental degradation?	75
3.3.2	Economic growth and the environment	77
3.4	Conclusion	89
4	PRESERVING NATURAL CAPITAL IN A WORLD OF RISK, UNCERTAINTY AND IGNORANCE	97
4.1	Distinctive features of natural capital	98
4.2	Risk, uncertainty and ignorance	99
4.3	Coping with risk, uncertainty and ignorance	102
4.3.1	Option and quasi-option values	102
4.3.2	The precautionary principle	104
4.3.3	Safe minimum standards (SMSs)	105
4.4	Which forms of natural capital should be preserved?	110
4.5	The problem of opportunity cost	118
4.6	Conclusion	121
5	MEASURING WEAK SUSTAINABILITY	126
5.1	Genuine savings (GS)	126
5.1.1	GS in a closed economy: a dynamic optimisation model	127
5.1.2	GS in an open economy	135
5.1.3	Problems with measuring GS in practice	137
5.1.4	GS in practice: a critique of the World Bank's computations	141
5.2	Index of Sustainable Economic Welfare (ISEW) and Genuine Progress Indicator (GPI)	152
5.2.1	A review of ISEW and GPI studies	154
5.2.2	Methodological problems	156
5.3	Conclusion	163
6	MEASURING STRONG SUSTAINABILITY	169
6.1	Physical indicators	169
6.1.1	Ecological footprints: measuring sustainability by land area	169
6.1.2	Material flows: measuring sustainability by weight	174
6.2	Hybrid indicators	179
6.2.1	The starting point: Hueting's pioneering work	179
6.2.2	Sustainability gaps	180
6.2.3	Greened National Statistical and Modelling Procedures	182
6.2.4	'Sustainable national income according to Hueting'	183
6.2.5	Critical assessment	185

7	CONCLUSIONS	188
<i>Appendix 1</i>	<i>How present-value maximisation can lead to extinction</i>	196
<i>Appendix 2</i>	<i>The Hotelling rule and Ramsey rule in a simple general equilibrium model</i>	198
<i>Appendix 3</i>	<i>The Hotelling rule and the Ramsey rule in a more complex model</i>	202
<i>Appendix 4</i>	<i>The World Bank's genuine savings accounting</i>	206
<i>Appendix 5</i>	<i>World Bank regional grouping of countries</i>	207
	<i>Bibliography</i>	210
	<i>Index</i>	261