

Content

List of Figures	7
List of Tables	9
Introduction	11
 1. The Political and Security Cooperation Potential of Visegrád Group Countries	17
1.1 The form of Visegrád Group cooperation	18
1.2 The potential and obstacles of political and security cooperation in Central Europe after the EU accession	21
1.3 Visegrád Group as a platform for coordination of foreign and security policy	24
1.3.1 Stabilisation on the periphery of the European continent	24
1.3.2 Security cooperation	25
1.3.3 Energy security cooperation	27
 2. Economic Potential of V4 Countries: Unity in Diversity	29
2.1 Post-communist experience 1990 – 2000 and transformation reforms	30
2.1.1 New economic and social system	31
2.1.2 Territorial re-orientation	32
2.1.3 Restructuring of the economy	33
2.1.4 Privatisation results	33
2.1.5 Economic and social performance	34
2.2 V4 accession to the EU in 2004	36
2.3 Present characteristics of the V4 economic potential	38
2.3.1 V4 and the global crisis	39
2.3.2 Competitiveness	43
 3. Visegrad Group Countries' Environmental Performance: History and Current State	46
3.1 Air pollution	46
3.2 Water management	49
3.3 Waste management	55
3.4 Protected areas	60
 4. The Environmental Performance of Visegrad Countries in Composite Indicators	65
4.1 The environmental component of the Commitment to Development Index	66
4.2 Environmental Performance Index	69
4.3 Ecological Footprint	72
 5. Air Pollution Management in Border Region: Case of Silesia	77
5.1 Current situation in air pollution in the MSR	78
5.2 Impacts of air pollution on human health	85

5.2.1	General impacts of air pollution on human health.....	85
5.2.2	Prior evidence of health risks related to the observed pollution levels	86
5.2.3	Programme Ostrava	89
5.3	Air quality information system for Polish-Czech border region: AIR SILESIA project.....	90
5.3.1	Input data processing	91
5.3.2	Modelling and analysis	92
5.3.3	Results.....	92
5.4	Air pollution mitigation measures	96
5.5	Political and international aspects of air quality improvement in the MSR.....	99
6.	River Basin Management in Border Regions:	
	Hungary-Slovakia Case Studies	104
6.1	Integrated Tisza River Basin Management Plan.....	104
6.2	The Bodrog project: Making space for water in the Bodrog River Basin	107
6.2.1	Formulation of the "Strategy for mitigation of floods in the countries of the Bodrog River Basin"	109
6.2.2	Pilot projects	109
6.2.3	Dissemination of results	111
6.2.4	Outcomes and lessons learnt of the Bodrog project	111
6.3	Hungary-Slovakia Cross-border Co-operation Programme (HUSK).....	112
6.4	Developing institutional connections between Hungary and Slovakia	114
6.5	Flood protection projects in Slovakia	114
6.5.1	Discover Floods.....	114
6.5.2	Floodlog.....	116
7.	National Parks at the Slovak-Polish Border:	
	Cases in Research and Education	118
7.1	Visitors' perceptions and economic effects of the Tatra National Parks in Poland and Slovakia	118
7.1.1	History and functions.....	118
7.1.2	Methodology and values.....	119
7.1.3	The research results	120
7.2	New model of education for promoting sustainable development: The case of the Polish-Slovakian border park in the Pieniny Mountains.....	126
7.2.1	The model and its development over time.....	126
7.2.2	Review of the long-term model activity on common action for sustainable development.....	128
7.2.3	Forms of activities	129
7.2.4	A new concept of education.....	130
7.2.5	A vision for future activities	131
8.	The 'Complex Knowledge Space' Model for Ex-ante Sustainability	
	Evaluation: A Possible Application to V4 Countries	133
8.1	The complex knowledge space model.....	133
8.1.1	Components of the environmental status and resource kit	136

8.1.2	Effects of environment utilisation and impacts	136
8.1.3	Components of the development of environmental resource utilisation – controls, plans, programmes	137
8.1.4	Combination of development policies and factors of environment utilisation	138
8.1.5	Recommended elements of the knowledge base of our model	138
8.2	Applying the complex knowledge space model in river basin management for V4 countries	140
8.2.1	Integrated Tisza River Basin Management Plan	141
9.	Healthy Housing Environment as one of the Most Important Aims of the Visegrad Group	145
9.1	Quality of the living environment	145
9.2	Assessment of the housing environment quality	147
9.3	Results of the research	155
9.3.1	Results of the interviews	155
9.3.2	Results of the urban analysis	156
10.	Information and Communication Technologies as an Aid in Solving Environmental Problems of Visegrad Countries	161
10.1	The role of ICT technologies in dealing with environmental issues	161
10.2	Utilisation of ICT technologies – good and bad practices	166
10.3	Suggestions for V4 policies	171
11.	Suitable Plant Indicators for Effective Biomonitoring of Atmospheric Deposition Rates in the Visegrad Area	174
11.1	Air pollution and its impact in the Visegrad group	174
11.2	Instrumental and plant monitoring of atmospheric quality	176
11.3	Experience with biomonitoring campaigns	177
11.4	Biomonitoring methods recommended for use in the Visegrad group	184
12.	Climate Change Adaptation Strategies for Cities in Visegrad Countries	186
12.1	Climate change consequences in Europe with respect to the V4 countries	186
12.1.1	Impacts of climate change in Europe and vulnerability of cities	186
12.1.2	Projected climate change in the V4 countries and its consequences in cities	188
12.2	Overview of European Union legal policies and reports supporting climate change adaptation strategies	189
12.3	Current status of activities in the V4 countries related to climate change adaptation actions	191
12.3.1	Differences and similarities among the V4 countries in terms of existing strategic documents, initiatives and actions	191
12.3.2	Czech Republic	191
12.3.3	Hungary	192
12.3.4	Poland	192
12.3.5	Slovakia	192

12.4	Examples of climate change-related activities implemented in the V4 cities	193
12.4.1	Czech Republic.....	193
12.4.2	Hungary	193
12.4.3	Poland.....	193
12.4.4	Slovakia	194
12.5	Current situation in the European cities and recommended approaches for V4 countries	196
12.5.1	Recommended procedure for the V4 cities to develop adaptation strategies	199
12.6	Working together in coalitions of V4 cities	201
13.	The Implementation of the Environmental Impact Assessment Process in Visegrad Group Countries	203
13.1	EIA and its role in the decision-making process	203
13.2	Comparison of EIA procedures in V4 countries.....	208
13.2.1	Slovakia	208
13.2.2	The Czech Republic.....	209
13.2.3	Poland	210
13.2.4	Hungary	212
13.3	Examples of good practices in transboundary EIA processes in V4 countries.....	212
13.3.1	Slovakia	213
13.3.2	The Czech Republic.....	213
13.3.3	Poland	214
13.3.4	Hungary	214
14.	Diffuse Water Pollution as a Significant Transnational Environmental Problem	216
14.1	Water pollution as a significant environmental problem	216
14.2	Diffuse water pollution from agriculture – A comparison between Slovakia and other V4 countries	217
14.3	Harmonisation of adopted measures with policy tools to solve the water pollution problem	222
15.	Eco-innovation Policy in Visegrad Group Countries	227
15.1	Relationship between public policy and eco-innovation	228
15.2	Eco-innovation policies in EU and Visegrad group countries.....	229
15.3	Efficiency of selected policy instruments	233
15.3.1	Data and Methodology	233
15.3.2	Efficiency analysis based on eco-innovation indicators	238
15.3.3	Efficiency analysis involving determinants of eco-innovation.....	244
	Conclusion	249
	References	252

List of Figures

Figure 2.1	GDP growth in Visegrad countries in 1990-1999	35
Figure 2.2	Inflation in V4 countries in 1991-1999	35
Figure 2.3	Unemployment rates in V4 countries in 1990-1999	36
Figure 2.4	Influence of EU accession on the transformation reform.....	37
Figure 2.5	Economic growth in the V4 countries in 2004-2007, (% , y-y).....	38
Figure 2.6	GDP growth in V4 countries compared to Germany in 2009-2014 (%, y-y)	39
Figure 2.7	General government balance in V4 countries compared to Germany in 2009-2014 (% of GDP).....	40
Figure 2.8	Private consumption in V4 countries compared to Germany in 2009-2014 (% , y-y).....	40
Figure 2.9	Public consumption in V4 countries compared to Germany in 2009-2014 (% , y-y).....	41
Figure 2.10	Unemployment rates in V4 countries compared to Germany in 2009-2014 (%)	42
Figure 2.11	General government debt in V4 countries compared to Germany in 2009-2014 (% of GDP).....	42
Figure 3.1	Air pollution in the Moravian-Silesian Region, Czech Republic (2000-2010).....	48
Figure 3.2	Air pollution in the Zilinsky Region, Slovakia (2000-2011).....	49
Figure 3.3	Total surface and groundwater abstraction for public water supply (m ³ .capita ⁻¹) and population connected to wastewater collection 'and treatment systems (%) in the Visegrad Group member countries.....	51
Figure 3.4	Generation of wastewater from point sources (mil. m ³ .year ⁻¹ , t O ₂ .day ⁻¹) in the Visegrad Group member countries.....	52
Figure 3.5	Water pollution in border monitoring stations-BOD (1993-2011) EQS – Environmental quality standards (EC, 2008)	53
Figure 3.6	Water pollution in border monitoring stations-COD (1993-2011) EQS – Environmental quality standards (EC, 2008)	53
Figure 3.7	Water pollution in border monitoring stations-nitrates (1993-2011) EQS – Environmental quality standards (EC, 2008)	54
Figure 3.8	Water pollution in border monitoring stations-total phosphorus (1993-2011) EQS – Environmental quality standards (EC, 2008).....	54
Figure 3.9	Imports of waste to the Czech Republic in tonnes (2009-2011)	57
Figure 3.10	Exports of waste from the Czech Republic in tonnes (2009-2011).....	58
Figure 3.11	Total municipal waste production and GDP per capita (2000-2011)	59
Figure 3.12	Transboundary protected areas in the 10 km buffer zone along the national boundaries in square kilometres (2011)	61
Figure 3.13	Transboundary protected areas in the 10 km buffer zone along the national boundaries (2011).....	62
Figure 5.1	Particulate matter concentrations in the Czech Republic and the Moravian-Silesian Region, 2010.....	78

Figure 5.2	Particulate matter emission trends in the Czech Republic and the Moravian-Silesian Region – totals	79
Figure 5.3	Sources of particulate matter emissions in the Moravian-Silesian Region.....	80
Figure 5.4	Map of annual average concentrations of PM ₁₀ in ambient air in 2011	81
Figure 5.5	Annual average concentrations of PM ₁₀ in the ambient air at selected monitoring stations in Ostrava and Prague, 2002-2011	81
Figure 5.6	Map of annual average concentrations of PM _{2.5} in ambient air in 2011	82
Figure 5.7	Annual average concentrations of PM _{2.5} in ambient air at selected monitoring stations in Ostrava and Prague, 2002-2011	83
Figure 5.8	Field of annual average concentrations of B(a)P in ambient air in 2011	83
Figure 5.9	Annual average concentrations of B(a)P in ambient air on selected monitoring stations in Ostrava and Prague, years 2002-2011	84
Figure 5.10	Monthly concentrations of B(a)P in Ostrava-Radvanice and Ostrava-Poruba in 2011 impact on pregnancy outcome and DNA fragmentation in sperm	87
Figure 5.11	Newly diagnosed bronchial asthma and allergy cases in children in Ostrava-Radvanice/Bartovice in 2001-2007.....	88
Figure 5.12	Children respiratory morbidity in Ostrava 2001-2009	90
Figure 5.13	Map composition of annual average PM ₁₀ concentration in 2006	93
Figure 5.14	Map composition of prevalence of industrial sources in annual average PM ₁₀ concentration in 2006	94
Figure 5.15	Map composition of influence of Polish and Czech sources on annual average PM ₁₀ concentration in 2006.....	95
Figure 6.1	Location of new and renewed structures on the oxbow	110
Figure 6.2	Hungary-Slovakia Cross-border Co-operation Programme regions	112
Figure 8.1	The complex environmental problem space	134
Figure 8.2	Environmental analysis - a multidisciplinary analysis of factors in the complex knowledge space	135
Figure 8.3	Complexity of indices	136
Figure 8.4	The combination of development policy tracts, impact and status factors ...	138
Figure 9.1	Main square of Nisko	147
Figure 9.2	Blocks of flats as contemporary, multi-family buildings in Nowa Sarzyna	148
Figure 9.3	Main square of Levoča.....	149
Figure 9.4	Central zone of Levoča	150
Figure 9.5	Results of the evaluation of the impact of various factors on the quality of the inhabited environment (Nisko, Nowa Sarzyna).....	155
Figure 11.1	Distribution of measured and interpolated cadmium concentrations in mosses throughout the Visegrad area in 2005.....	179
Figure 11.2	Temporal changes in sulphur concentrations in mosses (µg/g) throughout CZ between 1995 and 2010	180
Figure 11.3	Distribution of spruce bark acidity (bark extract pH) detected across CZ in 1995 and 2005.....	181
Figure 11.4	Distribution of ¹³⁷ Cs activities archived in forest floor humus (Bq/kg) in CZ in 1995	182

Figure 13.1	The role of EIA in the decision-making process.....	204
Figure 14.1	Fertiliser consumption in Slovakia in the period 1990 to 2011 (kg/ha).....	218
Figure 14.2	Livestock numbers in Slovakia in the period 1990 to 2011 (thousands of heads).....	219
Figure 14.3	Nitrogen balance in Slovakia in the period 1990 – 2011 (kg/ha).....	220
Figure 14.4	Percentage of groundwater bodies in poor and good status, by area	223
Figure 14.5	Percentage of river and lake water bodies in poor and good status, by count of water bodies, including those with unknown status	224
Figure 15.1	EU-27 Eco-innovation scoreboard 2011 – composite index.....	231
Figure 15.2	Efficiency scores of Visegrad countries with respect to eco-innovation indicators by CCR-I model in 2004.....	240
Figure 15.3	Efficiency scores of Visegrad countries with respect to eco-innovation indicators by BCC-I model in 2004.....	241
Figure 15.4	Efficiency scores of Visegrad countries with respect to eco-innovation indicators by SBM-I-C model in 2004.....	241
Figure 15.5	Efficiency scores of Visegrad countries with respect to eco-innovation indicators by SBM-I-C model in 2004.....	242
Figure 15.6	Efficiency scores of Visegrad countries with respect to eco-innovation indicators by CCR-I model in 2008.....	242
Figure 15.7	Efficiency scores of Visegrad countries with respect to eco-innovation indicators by BCC-I model in 2008.....	243
Figure 15.8	Efficiency scores of Visegrad countries with respect to eco-innovation indicators by SBM-I-C model in 2008.....	243
Figure 15.9	Efficiency scores of Visegrad countries with respect to eco-innovation indicators by SBM-I-V model in 2008	244
Figure 15.10	Efficiency scores of Visegrad countries with respect to determinants of eco-innovation by CCR-I model in 2008	245
Figure 15.11	Efficiency scores of Visegrad countries with respect to determinants of eco-innovation by BCC-I model in 2008	246
Figure 15.12	Efficiency scores of Visegrad countries with respect to determinants of eco-innovation by SBM-I-C model in 2008	246
Figure 15.13	Efficiency scores of Visegrad countries with respect to determinants of eco-innovation by SBM-I-V model in 2008	247

List of Tables

Table 2.1	Corruption Perception Index 2004 – 2012.....	43
Table 2.2	Ease of Doing Business index of the V4 countries in comparison with other CE countries in 2007-2012	44
Table 2.3	Total expenditures on R&D in the V4 countries in comparison with other CE countries in 2004-2012 (as % of total GDP)	44
Table 2.4	Global Competitiveness Index of the V4 countries in comparison with other CE countries in 2007-2010	45
Table 3.1	Imports of waste to the Czech Republic in tonnes (2009–2011).....	57
Table 3.2	Exports of waste from the Czech Republic in tonnes (2009–2011).....	58

Table 4.1	Environmental component of the CDI – structure	66
Table 4.2	Environmental component of the CDI – results.....	67
Table 4.3	Environmental Performance Index – structure	70
Table 4.4	Environmental Performance Index – results	71
Table 4.5	Ecological Footprint – results	73
Table 6.1	Breakdown of funding by priority axes (EUR).....	113
Table 8.1	Indicators of environment utilisation and impact.....	137
Table 9.1	Guidelines for the research.....	146
Table 9.2	Summary of characteristics of Nisko	147
Table 9.3	Summary of characteristics of Nowa Sarzyna	148
Table 9.4	Summary of characteristics of Levoča	149
Table 9.5	Indicators, elements and factors supporting the health-promoting character of a housing environment	152
Table 9.6	Elements and factors supporting the health-promoting character of a housing environment	152
Table 9.7	Sustainable design aspects	153
Table 9.8	Criteria for assessing factors which influence the spatial composition of urban areas	154
Table 9.9	Indicators, elements and factors determining the healthy character of zone I in Levoča	157
Table 9.10	Spatial composition of the residential environment	159
Table 12.1	Expected increase in the number of combined tropical nights (minimum temperature exceeding 20°C) and hot days (maximum temperature exceeding 35°C).....	189
Table 12.2	Procedure of development of the climate change adaptation strategy for the city of Bratislava	195
Table 12.3	Examples of initiatives and actions relating to climate change measures in the V4 cities.....	195
Table 13.1	Evaluation of EIA systems	205
Table 14.1	Livestock density in the Visegrad and selected EU-15 countries in the period 2001 to 2007 (LU/ha of utilised agricultural land) LU = Livestock unit	221
Table 15.1	Selected eco-innovation indicators in 2004	235
Table 15.2	Selected eco-innovation indicators in 2008	236
Table 15.3	Determinants of eco-innovation in 2008	237
Table 15.4	Technical efficiencies of Visegrad countries within EU-27 applying different DEA models to selected eco-innovation indicators.....	238
Table 15.5	Ranking of Visegrad countries within EU-27 applying different DEA models to selected eco-innovation indicators	239
Table 15.6	Reference countries for Visegrad countries within EU-27 applying different DEA models to selected eco-innovation indicators in 2004.....	239
Table 15.7	Reference countries for Visegrad countries within EU-27 applying different DEA models to selected eco-innovation indicators in 2008.....	240
Table 15.8	Technical efficiencies and ranking of Visegrad countries within EU-27 applying different DEA models to determinants of eco-innovation in 2008	244