

SYSTEMS RESEARCH INSTITUTE  
POLISH ACADEMY OF SCIENCES

INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS

CONTRACTED STUDY AGREEMENT REG /POL/1

**"CONCEPTS AND TOOLS FOR STRATEGIC REGIONAL  
SOCIO-ECONOMIC CHANGE POLICY"**

**STUDY REPORT**

**PART 1**

**BACKGROUND METHODOLOGIES**

**COORDINATOR, IIASA : A. KOCHETKOV  
COORDINATOR, SRI PAS: A.STRASZAK**

ZTS/ZPZC/ZTSW 1-36/85

WARSAW 1986

SYSTEMS RESEARCH INSTITUTE  
POLISH ACADEMY OF SCIENCES  
AND  
INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS

CONTRACTED STUDY AGREEMENT REG/POL/1  
"CONCEPTS AND TOOLS FOR STRATEGIC REGIONAL  
SOCIO-ECONOMIC CHANGE POLICY"

STUDY REPORT  
Consisting of 3 Parts

PART 1  
BACKGROUND METHODOLOGIES

COORDINATOR, IIASA: A. KOCHETKOV  
COORDINATOR, SRI PAS: A. STRASZAK

ZTS/ZPZC/ZTSW 1-36/85

W A R S A W 1986

Podr. ZTS

5, 4, 4



38848 / I

TABLE OF CONTENTS

	Page
INTRODUCTION, by Andrzej Straszak .....	V
PART 1: BACKGROUND METHODOLOGIES ..... XI	
I. PROSPECTIVE EXPLORATORY ANALYSIS: AN OUTLINE OF APPROACH by Jan w. Owiński .....	1
I.1. The problem .....	1
I.2. The approach .....	3
I.3. Implementation .....	5
I.4. Concluding remarks .....	8
II. METHODOLOGY OF APPLICATION OF A CROSS-IMPACT TECHNIQUE by Andrzej Jakubowski .....	11
II.1. Introduction .....	11
II.2. Existing techniques and their modifications ...	13
II.3. Theoretical fundations of the Turoff's version of the cross-impact method .....	15
II.4. Development scenario preparation procedure ....	26
II.5. Concluding remarks .....	42
II.6. References .....	45
III. TOWARDS A MORE REALISTIC DECISION SUPPORT VIA "HUMAN-CONSISTENT" COMMONSENSE-KNOWLEDGE- BASED DECISION MODEL, by Janusz Kacprzyk .....	48
III.1. Introduction .....	48
III.2. Basic elements of Zadeh's approach to the representation and manipulation of commonsense knowledge .....	52
III.3. Commonsense-knowledge-based multicriteria decision making models .....	55
III.4. Commonsense-knowledge-based multistage decision making (control) models .....	58

III.5. Some remarks on commonsense knowledge in group decision making and consensus formation models .....	61
III.6. Concluding remarks .....	61
III.7. References .....	62
IV. INVESTMENTS AND CREDITS AS CONTROL TOOLS IN A CENTRALLY PLANNED ECONOMY, by Krzysztof Cichocki and Waldemar Wojciechowski .....	
IV.1. Introduction .....	64
IV.2. The two-level structure of controlling the national economy .....	64
IV.3. The upper level problem .....	68
IV.4. The lower level problem of a branch .....	74
IV.5. Summary and conclusions .....	82
IV.6. References .....	83
V. ESTIMATION OF INVESTMENT LAGS AND THEIR IMPACT ON PRODUCTIVE CAPITAL FORMATION, by Krzysztof Cichocki and Waldemar Wojciechowski .....	
V.1. Introduction .....	85
V.2. Estimation of investment delay coefficients .....	85
V.3. Numerical example .....	93
V.4. Conclusion .....	95
V.5. References .....	95
VI. A BRIEF DESCRIPTION OF THE POLISH BANKING SYSTEM, by Małgorzata Lewandowska .....	
	96
VII. STRATEGIC ASPECTS OF TAX REGULATIONS, by J. Stefański and A. Straszak .....	
VII.1. Introduction .....	105
VII.2. Regional economy system as a dynamic game .....	106
VII.3. Basic strategies .....	113
VII.4. Negotiated agreements .....	115
VII.5. Concluding remarks .....	120
VII.6. References .....	120

VIII. COOPERATIVE AGREEMENTS AND CREDIBILITY IN DYNAMIC SOCIO-ECONOMIC SYSTEM, by J. Stefański .....	123
VIII.1. Introduction .....	123
VIII.2. Cooperation in dynamic systems .....	124
VIII.3. Credibility of retaliation threats .....	128
VIII.4. The roles of threats in a dynamic game .....	130
VIII.5. Bargaining and the choice of threats .....	131
VIII.6. Concluding remarks .....	132
VIII.7. References .....	133
IX. MICROCOMPUTER SIMULATION OF THE DYNAMIC BEHAVIOR OF ECONOMIC AGENTS, by A. Straszak, J. Stefański and A. Ziółkowski .....	135
IX.1. Introduction .....	135
IX.2. Tax regulations in the Polish economic system..	136
IX.3. Microcomputer simulation of the Polish tax regulation system .....	139
IX.4. Concluding remarks .....	147
IX.5. References .....	147

IBS

ZTS

38848/I

podręczna

STUDY REPORT

PART 1:

AUTHORS: A

B  
J.  
A  
J.  
K  
M  
W  
J.  
A

**PION III**

PART 2: POLISH CASE STUDY REPORT

AUTHORS: J.W. OWSIŃSKI  
W. CIECHANOWICZ  
J. BABAROWSKI  
A. STRASZAK  
A. JAKUBOWSKI

PART 3: APPENDIX: SOFTWARE AVAILABLE

AUTHORS: L. KSIĘŻOPOLSKA  
S. ZADROŻNY  
J.W. OWSIŃSKI  
T. ROMANOWICZ  
A. ZIÓŁKOWSKI  
W. CICHOCKI  
C. IWAŃSKI  
A. KAŁUSZKO  
P. HOLNICKI