

**CONFLICT RESOLUTION IN TRANSBOUNDARY  
WATERCOURSES THROUGH INTEGRATION OF AN  
OPERATIONALISED LEGAL DOCTRINE WITH GIS BASED  
HYDROLOGICAL MODELLING**

by

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River boundary disputes - India  
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## CERTIFICATE

This is to certify that the thesis entitled, “**CONFLICT RESOLUTION IN TRANSBOUNDARY WATERCOURSES THROUGH INTEGRATION OF AN OPERATIONALISED LEGAL DOCTRINE WITH GIS BASED HYDROLOGICAL MODELLING,**” being submitted by Mr. **Amardeep Singh** to the Indian Institute of Technology Delhi for the award of Doctor of Philosophy is a record of bonafide research work carried out by him under my guidance and supervision in conformity with the rules and regulations of the Indian Institute of Technology Delhi. The research report and results presented in this thesis have not been submitted, in part or full, to any other university or Institute for the award of any degree or diploma.



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## ABSTRACT

Human beings have delineated the land into countries and states. But the natural resources which have been bestowed upon the human beings have no regard, whatsoever, for the international boundaries. In no other natural resource is this fact more evident than in the case of water. Rivers know no boundaries, be they national or international. The aim of the present study is to suggest a mechanism for resolving conflicts pertaining to the transboundary watercourses in a holistic manner, integrating the legal, technological and administrative aspects, for the present as well as futuristic climatic conditions, by taking a case study of a multi-jurisdictional river basin in India. The legal doctrines pertaining to conflict resolution in transboundary watercourses have been reviewed for the purpose of their comparison and selection of the most suitable one for the Indian scenario. Based on the above review, principle of reasonable and equitable utilisation has been identified as the legal doctrine having widespread international acceptance as well as being the most suitable one for sharing waters of a multi-jurisdictional river basin in India. Furthermore, a set of quantifiable formulae were devised for water allocations among the riparian states on the basis of the identified legal doctrine (Operationalisation of the legal doctrine). GIS based hydrological modelling was utilised for estimating the total water yield in an interstate river basin in India. Moreover, futuristic scenarios for different land use changes were generated and the resultant water yields computed. The results obtained from the modelling were used in conjunction with the water sharing formulae so as to calculate the amount of water to be allocated to each of the riparian states for the interstate river in question. Also water allocations for different states were done under various simulated land use changes for the present as well as the future climate change

scenarios. Finally, long term policy changes were suggested for resolving interstate river water disputes in India in the light of Indian Constitutional provisions as well as the relevant parliamentary legislations.

## Table of Contents

		Page No.
<i>Certificate</i>		<i>i</i>
<i>Acknowledgements</i>		<i>iii</i>
<i>Abstract</i>		<i>vii</i>
<i>Table of Contents</i>		<i>ix</i>
<i>List of Figures</i>		<i>xiii</i>
<i>List of Tables</i>		<i>xix</i>
<i>List of Abbreviations and Symbols</i>		<i>xxi</i>
Chapter: 1	Introduction	1
1.1	General	1
1.2	Problems of Transboundary Watercourses	2
1.3	Statement of the Problem	4
1.4	Scope of the Work	4
1.5	Objectives of the Present Study	5
1.6	Methodology	6
1.7	Organisation of Dissertation	7
Chapter: 2	Literature Review	9
2.1	General	9
2.2	Philosophies behind International Water Sharing Laws	9
	2.2.1 Harmon Doctrine	10
	2.2.2 Principle of Absolute Territorial Integrity	10
	2.2.3 Prior Use Principle	11
	2.2.4 Principle of No Significant Harm	11
	2.2.5 Principle of Reasonable and Equitable Use	12
2.3	Work done by international organisations	14
	2.3.1 General	
	2.3.2 UN Convention (1997)	14
	2.3.3 Status of the UN Convention	16
	2.3.4 India's Stand in the UN Convention	18
2.4	Provisions in the Indian Constitution	18
	2.4.1 Federal Features of the Indian Constitution	18
	2.4.2 Non Federal Features of the Indian Constitution	20
	2.4.3 A Federation Sui Generis	23
	2.4.4 Comparison with the US Scenario	23
	2.4.5 Provisions pertaining to interstate river disputes in the Indian Constitution	24
2.5	Parliamentary Legislations	25
	2.5.1 Interstate Water Disputes Act	25
	2.5.2 River Boards Act	26
	2.5.3 Comparison and Discussion	27
2.6	Climate Change	28

2.7	Hydrological Modelling	30
2.7.1	Overview of hydrological models	31
2.7.2	Model Selection	34
2.7.3	SWAT applications in India	35
2.8	Conclusions	38
<b>Chapter: 3</b>	<b>Description of the Study Area</b>	<b>41</b>
3.1	Cauvery River System	41
3.2	Agricultural Practices	43
3.3	Geology	47
3.4	Soils	51
3.5	Climate	54
3.6	Rainfall	55
3.7	Summary of the basic data	59
3.8	Core of the Dispute	61
<b>Chapter: 4</b>	<b>Cauvery River Dispute</b>	<b>63</b>
4.1	General	63
4.2	Previous Agreements	64
4.2.1	The 1892 Agreement	65
4.2.2	Period 1892-1913	67
4.2.3	Griffin Arbitration 1913-14	69
4.2.4	Background of 1924 Agreement	70
4.2.5	The 1924 Agreement	71
4.2.6	1892 and 1924 Agreements: A Critical Review	73
4.3	Irrigation Development in the Cauvery Basin	75
4.3.1	First Phase (Upto 1924)	76
4.3.2	Second Phase (1924-1934)	77
4.3.2	Third Phase (1934-1972)	77
4.3.4	Fourth Phase (Post 1972)	79
4.3.5	Summary of Actual Utilisations (1934-1990)	83
4.4	The Cauvery Water Disputes Tribunal	86
4.4.1	Constitution of Cauvery Water Disputes Tribunal	88
4.4.2	Interim Order of the Cauvery Water Disputes Tribunal	89
4.4.3	Post Interim Order Scenario	92
4.4.4	Constitution of the Cauvery River Authority	96
4.5	Award of Cauvery Water Disputes Tribunal	96
<b>Chapter: 5</b>	<b>Operationalisation of the Legal Doctrine</b>	<b>99</b>
5.1	Introduction	99
5.2	Factors enshrined in the UN Convention	99
5.3	Axiomatic Approach	100
5.4	Water Allocation Component	101
5.5	Normalised Water Allocation Component	103

5.6	Introduction to Delphi Technique	104
5.7	Delphi Applications	104
5.8	Calculation of Weightages using Delphi Technique	105
5.9	Estimation of Water Allocation Components	109
5.10	Estimation of Normalised Water Allocation Components	110
5.11	Estimation of Water Allocations	111
<b>Chapter: 6</b>	<b>Description of the Hydrological Model</b>	<b>113</b>
6.1	Introduction	113
6.2	Development of SWAT	114
6.3	Overview of SWAT	116
6.3.1	Water Balance	119
6.3.2	Surface Runoff	119
6.3.3	Sub Surface Flow	120
6.3.4	Evapotranspiration	123
6.3.5	Climate	124
6.3.6	Crop Growth	126
6.3.7	Reservoirs	127
<b>Chapter: 7</b>	<b>Hydrological Modelling for Cauvery River Basin</b>	<b>129</b>
7.1	General	129
7.2	Data Inputs	129
7.2.1	Contours	129
7.2.2	Stream Network	130
7.2.3	Land Use data	131
7.2.4	Soil Class data	131
7.2.5	Climatic data	133
7.2.6	Reservoir data	134
7.3	Preprocessing	135
7.3.1	DEM Generation	135
7.3.2	Watershed Delineation	137
7.3.3	HRU Generation	140
7.4	Model Calibration	141
<b>Chapter: 8</b>	<b>Scenario Generation Using SWAT</b>	<b>145</b>
8.1	General	145
8.2	Scenario Generation for Various Land Use Changes	146
8.3	Scenario Generation for Various Legal Doctrines	149
8.4	Scenario Generation for Futuristic Climate Changes	160
8.5	Variability Analysis	177
8.6	Results and Discussion	184
<b>Chapter: 9</b>	<b>Conclusions and Suggestions</b>	<b>187</b>
9.1	General	187

9.2	Results and Discussion	188
9.3	Comprehensive Action Plan for Management of Indian Interstate Rivers	190
9.4	Contributions of the Present Study	193
9.5	Caveats of the Present Study	193
9.6	Scope for Future Research	194
<b>References</b>		195
<b>Appendices</b>		205
Appendix I	Award of Cauvery Water Disputes Tribunal	205
Appendix II	Questionnaire used for Delphi technique	213
	List of Publications	217
	Brief biodata of the Author	219