

## LIST OF FIGURES

<b>Figure No.</b>	<b>Titles</b>	<b>Page No.</b>
Figure 1.1	: Water Sample Collection and Analysis	8
Figure 1.2	: Esico Flame-Photometer	10
Figure 1.3	: Flow Diagram of Methodology	11
Figure 1.4	: Sample Analysis, Department of Geography, Faculty of Science, The M.S. University of Baroda	12
Figure 2.1	: Location Map of the Study Area	17
Figure 2.2	: Taluka and District Headquarters of the Study Area	18
Figure 2.3	: Geomorphology Map of the Study Area	19
Figure 2.4	: Geological Map of the Study Area	20
Figure 2.5	: Drainage Map of the Study Area	21
Figure 2.6	: Industries of the Study Area	24
Figure 2.7	: Transportation Map of the Study Area	25
Figure 2.8	: Land Use and Land Cover Map of the Study Region	27
Figure 3.1a	: Descriptive Statistics of pH in Surface Water during Post-monsoon, 2015	30
Figure 3.1b	: Spatial Distribution of pH in Surface Water during Post-monsoon, 2015	30
Figure 3.2a	: Descriptive Statistics of TDS in Surface Water during Post- monsoon, 2015	31
Figure 3.2b	: Spatial Distribution of TDS in Surface Water during Post-monsoon, 2015	31
Figure 3.3a	: Descriptive Statistics of Calcium (Ca) in Surface Water during Post-monsoon, 2015	32
Figure 3.3b	: Spatial Distribution of Calcium (Ca) in Surface Water during Post- monsoon, 2015	32
Figure 3.4a	: Descriptive Statistics of Sodium (Na) in Surface Water during Post- monsoon, 2015	33

Figure 3.4b	:	Spatial Distribution of Sodium (Na) in Surface Water during Post-monsoon, 2015	33
Figure 3.5a	:	Descriptive Statistics of pH in Sub-surface Water during Post-monsoon, 2015	35
Figure 3.5b	:	Spatial Distribution of pH in Sub-surface Water during Post-monsoon, 2015	35
Figure 3.6a	:	Descriptive Statistics of TDS in Sub-surface Water during Post-monsoon, 2015	36
Figure 3.6b	:	Spatial Distribution of TDS in Sub-surface Water during Post-monsoon, 2015	36
Figure 3.7a	:	Descriptive Statistics of Calcium (Ca) in Sub-surface Water during Post-monsoon, 2015	37
Figure 3.7b	:	Spatial Distribution of Calcium (Ca) in Sub-surface Water during Post-monsoon, 2015	37
Figure 3.8a	:	Descriptive Statistics of Sodium (Na) in Sub-surface Water during Post-monsoon, 2015	39
Figure 3.8b	:	Spatial Distribution of Sodium (Na) in Sub-surface Water during Post-monsoon, 2015	39
Figure 3.9a	:	Descriptive Statistics of pH in Surface Water during Pre-monsoon, 2016	40
Figure 3.9b	:	Spatial Distribution of pH in Surface Water during Pre-monsoon, 2016	40
Figure 3.10a	:	Descriptive Statistics of TDS in Surface Water during Pre-monsoon, 2016	41
Figure 3.10b	:	Spatial Distribution of TDS in Surface Water during Pre-monsoon, 2016	41
Figure 3.11a	:	Descriptive Statistics of Calcium (Ca) in Surface Water during Pre-monsoon, 2016	42
Figure 3.11b	:	Spatial Distribution of Calcium (Ca) in Surface Water during Pre-monsoon, 2016	42
Figure 3.12a	:	Descriptive Statistics of Sodium (Na) in Surface Water during Pre-monsoon, 2016	44
Figure 3.12b	:	Spatial Distribution of Sodium (Na) in Surface Water during Pre-monsoon, 2016	44
Figure 3.13a	:	Descriptive Statistics of Fluoride (F) in Surface Water during Pre-monsoon, 2016	45
Figure 3.13b	:	Spatial Distribution of Fluoride (F) in Surface Water during Pre-monsoon, 2016	45
Figure 3.14a	:	Descriptive Statistics of pH in Sub-surface Water during Pre-monsoon, 2016	47
Figure 3.14b	:	Spatial Distribution of pH in Sub-surface Water during Pre-monsoon, 2016	47

Figure 3.15a	:	Descriptive Statistics of TDS in Sub-surface Water during Pre-monsoon, 2016	48
Figure 3.15b	:	Spatial Distribution of TDS in Sub-surface Water during Pre-monsoon, 2016	48
Figure 3.16a	:	Descriptive Statistics of Calcium (Ca) in Sub-surface Water during Pre-monsoon, 2016	49
Figure 3.16b	:	Spatial Distribution of Calcium (Ca) in Sub-surface Water during Pre-monsoon, 2016	49
Figure 3.17a	:	Descriptive Statistics of Sodium (Na) in Sub-surface Water during Pre-monsoon, 2016	51
Figure 3.17b	:	Spatial Distribution of Sodium (Na) in Sub-surface Water during Pre-monsoon, 2016	51
Figure 3.18a	:	Descriptive Statistics of Fluoride (F) in Sub-surface Water during Pre-monsoon, 2016	52
Figure 3.18b	:	Spatial Distribution of Fluoride (F) in Sub-surface Water during Pre-monsoon, 2016	52
Figure 3.19a	:	Descriptive Statistics of pH in Surface Water during Monsoon, 2016	54
Figure 3.19b	:	Spatial Distribution of pH in Surface Water during Monsoon, 2016	54
Figure 3.20a	:	Descriptive Statistics of TDS in Surface Water during Monsoon, 2016	55
Figure 3.20b	:	Spatial Distribution of TDS in Surface Water during Monsoon, 2016	55
Figure 3.21a	:	Descriptive Statistics of Calcium (Ca) in Surface Water during Monsoon, 2016	56
Figure 3.21b	:	Spatial Distribution of Calcium (Ca) in Surface Water during Monsoon, 2016	56
Figure 3.22a	:	Descriptive Statistics of Sodium (Na) in Surface Water during Monsoon, 2016	58
Figure 3.22b	:	Spatial Distribution of Sodium (Na) in Surface Water during Monsoon, 2016	58
Figure 3.23a	:	Descriptive Statistics of Fluoride (F) in Surface Water during Monsoon, 2016	59
Figure 3.23b	:	Spatial Distribution of Fluoride (F) in Surface Water during Monsoon, 2016	59
Figure 3.24a	:	Descriptive Statistics of pH in Sub-surface Water during Monsoon, 2016	60
Figure 3.24b	:	Spatial Distribution of pH in Sub-surface Water during Monsoon, 2016	60
Figure 3.25a	:	Descriptive Statistics of TDS in Sub-surface Water during Monsoon, 2016	62
Figure 3.25b	:	Spatial Distribution of TDS in Sub-surface Water during Monsoon, 2016	62

Figure 3.26a	:	Descriptive Statistics of Calcium (Ca) in Sub-surface Water during Monsoon, 2016	63
Figure 3.26b	:	Spatial Distribution of Calcium (Ca) in Sub-surface Water during Monsoon, 2016	63
Figure 3.27a	:	Descriptive Statistics of Sodium (Na) in Sub-surface Water during Monsoon, 2016	64
Figure 3.27b	:	Spatial Distribution of Sodium (Na) in Sub-surface Water during Monsoon, 2016	64
Figure 3.28a	:	Descriptive Statistics of Fluoride (F) in Sub-surface Water during Monsoon, 2016	65
Figure 3.28b	:	Spatial Distribution of Fluoride (F) in Sub-surface Water during Monsoon, 2016	65
Figure 3.29a	:	Descriptive Statistics of pH in Surface Water during Post-monsoon, 2016	67
Figure 3.29b	:	Spatial Distribution of pH in Surface Water during Post-monsoon, 2016	67
Figure 3.30a	:	Descriptive Statistics of TDS in Surface Water during Post-monsoon, 2016	68
Figure 3.30b	:	Spatial Distribution of TDS in Surface Water during Post-monsoon, 2016	68
Figure 3.31a	:	Descriptive Statistics of Calcium (Ca) in Surface Water during Post-monsoon, 2016	69
Figure 3.31b	:	Spatial Distribution of Calcium (Ca) in Surface Water during Post-monsoon, 2016	69
Figure 3.32a	:	Descriptive Statistics of Sodium (Na) in Surface Water during Post-monsoon, 2016	71
Figure 3.32b	:	Spatial Distribution of Sodium (Na) in Surface Water during Post-monsoon, 2016	71
Figure 3.33a	:	Descriptive Statistics of Fluoride (F) in Surface Water during Post-monsoon, 2016	72
Figure 3.33b	:	Descriptive Statistics of Fluoride (F) in Surface Water during Post-monsoon, 2016	72
Figure 3.34a	:	Descriptive Statistics of pH in Sub-surface Water during Post-monsoon, 2016	74
Figure 3.34b	:	Spatial Distribution of pH in Sub-surface Water during Post-monsoon, 2016	74
Figure 3.35a	:	Descriptive Statistics of TDS in Sub-surface Water during Post-monsoon, 2016	75
Figure 3.35b	:	Spatial Distribution of TDS in Sub-surface Water during Post-monsoon, 2016	75
Figure 3.36a	:	Descriptive Statistics of Calcium (Ca) in Sub-surface Water during Post-monsoon, 2016	76

Figure 3.36b	:	Spatial Distribution of Calcium (Ca) in Sub-surface Water during Post-monsoon, 2016	76
Figure 3.37a	:	Descriptive Statistics of Sodium (Na) in Sub-surface Water during Post-monsoon, 2016	77
Figure 3.37b	:	Spatial Distribution of Sodium (Na) in Sub-surface Water during Post-monsoon, 2016	77
Figure 3.38a	:	Descriptive Statistics of Fluoride (F) in Sub-surface Water during Post-monsoon, 2016	79
Figure 3.38b	:	Spatial Distribution of Fluoride (F) in Sub-surface Water during Post-monsoon, 2016	79
Figure 3.39a	:	Descriptive Statistics of pH in Surface Water during Pre-monsoon, 2017	80
Figure 3.39b	:	Spatial Distribution of pH in Surface Water during Pre-monsoon, 2017	80
Figure 3.40a	:	Descriptive Statistics of TDS in Surface Water during Pre-monsoon, 2017	82
Figure 3.40b	:	Spatial Distribution of TDS in Surface Water during Pre-monsoon, 2017	82
Figure 3.41a	:	Descriptive Statistics of Calcium (Ca) in Surface Water during Pre-monsoon, 2017	83
Figure 3.41b	:	Spatial Distribution of Calcium (Ca) in Surface Water during Pre-monsoon, 2017	83
Figure 3.42a	:	Descriptive Statistics of Sodium (Na) in Surface Water during Pre-monsoon, 2017	84
Figure 3.42b	:	Spatial Distribution of Sodium (Na) in Surface Water during Pre-monsoon, 2017	84
Figure 3.43a	:	Descriptive Statistics of Fluoride (F) in Surface Water during Pre-monsoon, 2017	85
Figure 3.43b	:	Descriptive Statistics of Fluoride (F) in Surface Water during Pre-monsoon, 2017	85
Figure 3.44a	:	Descriptive Statistics of pH in Sub-surface Water during Pre-monsoon, 2017	87
Figure 3.44b	:	Spatial Distribution of pH in Sub-surface Water during Pre-monsoon, 2017	87
Figure 3.45a	:	Descriptive Statistics of TDS in Sub-surface Water during Pre-monsoon, 2017	88
Figure 3.45b	:	Spatial Distribution of TDS in Sub-surface Water during Pre-monsoon, 2017	88
Figure 3.46a	:	Descriptive Statistics of Calcium (Ca) in Sub-surface Water during Pre-monsoon, 2017	89
Figure 3.46b	:	Spatial Distribution of Calcium (Ca) in Sub-surface Water during Pre-monsoon, 2017	89

Figure 3.47a	:	Descriptive Statistics of Sodium (Na) in Sub-surface Water during Pre-monsoon, 2017	90
Figure 3.47b	:	Spatial Distribution of Sodium (Na) in Sub-surface Water during Pre-monsoon, 2017	90
Figure 3.48a	:	Descriptive Statistics of Fluoride (F) in Sub-surface Water during Pre-monsoon, 2017	92
Figure 3.48b	:	Spatial Distribution of Fluoride (F) in Sub-surface Water during Pre-monsoon, 2017	92
Figure 3.49a	:	Descriptive Statistics of pH in Surface Water during Monsoon, 2017	93
Figure 3.49b	:	Spatial Distribution of pH in Surface Water during Monsoon, 2017	93
Figure 3.50a	:	Descriptive Statistics of TDS in Surface Water during Monsoon, 2017	94
Figure 3.50b	:	Spatial Distribution of TDS in Surface Water during Monsoon, 2017	94
Figure 3.51a	:	Descriptive Statistics of Calcium (Ca) in Surface Water during Monsoon, 2017	95
Figure 3.51b	:	Spatial Distribution of Calcium (Ca) in Surface Water during Monsoon, 2017	95
Figure 3.52a	:	Descriptive Statistics of Sodium (Na) in Surface Water during Monsoon, 2017	97
Figure 3.52b	:	Spatial Distribution of Sodium (Na) in Surface Water during Monsoon, 2017	97
Figure 3.53a	:	Descriptive Statistics of Fluoride (F) in Surface Water during Monsoon, 2017	98
Figure 3.53b	:	Descriptive Statistics of Fluoride (F) in Surface Water during Monsoon, 2017	98
Figure 3.54a	:	Descriptive Statistics of pH in Sub-surface Water during Monsoon, 2017	100
Figure 3.54b	:	Spatial Distribution of pH in Sub-surface Water during Monsoon, 2017	100
Figure 3.55a	:	Descriptive Statistics of TDS in Sub-surface Water during Monsoon, 2017	101
Figure 3.55b	:	Spatial Distribution of TDS in Sub-surface Water during Monsoon, 2017	101
Figure 3.56a	:	Descriptive Statistics of Calcium (Ca) in Sub-surface Water during Monsoon, 2017	102
Figure 3.56b	:	Spatial Distribution of Calcium (Ca) in Sub-surface Water during Monsoon, 2017	102
Figure 3.57a	:	Descriptive Statistics of Sodium (Na) in Sub-surface Water during Monsoon, 2017	104
Figure 3.57b	:	Spatial Distribution of Sodium (Na) in Sub-surface Water during Monsoon, 2017	104

Figure 3.58a	:	Descriptive Statistics of Fluoride (F) in Sub-surface Water during Monsoon, 2017	105
Figure 3.58b	:	Spatial Distribution of Fluoride (F) in Sub-surface Water during Monsoon, 2017	105
Figure 4.1	:	WQI of Pre-monsoon Season (Surface Water)	120
Figure 4.2	:	WQI Category Wise Percentage of Distribution for Pre-monsoon Season (Surface Water).	121
Figure 4.3	:	WQI of Monsoon Season (Surface Water)	122
Figure 4.4	:	WQI Category Wise Percentage of Distribution for Monsoon Season (Surface Water)	123
Figure 4.5	:	WQI of Post-monsoon Season (Surface Water)	124
Figure 4.6	:	WQI Category Wise Percentage of Distribution for Post-monsoon Season (Surface Water)	125
Figure 4.7	:	WQI of Pre-monsoon Season (Sub-surface Water)	129
Figure 4.8	:	WQI Category Wise Percentage of Distribution for Pre-monsoon Season (Sub-surface Water)	130
Figure 4.9	:	WQI of Monsoon Season (Sub-surface Water)	131
Figure 4.10	:	WQI Category Wise Percentage of Distribution for Monsoon Season (Sub-surface Water)	132
Figure 4.11	:	WQI of Post-monsoon Season (Sub-surface Water)	133
Figure 4.12	:	WQI Category Wise Percentage of Distribution for Post-monsoon Season (Sub-surface Water)	134
Figure 5.1	:	Flow Chart of Methodology for Preparation of Land Use/Land Cover Maps (1997 & 2017)	154
Figure 5.2	:	Land Use/Land Cover of LISS-III (1997)	155
Figure 5.3	:	Land Use/Land Cover of LISS-IV (2017)	156
Figure 5.4	:	LU/LC classes (1997-2017)	158
Figure 5.5	:	Land Use/Land Cover - Sachin GIDC	159
Figure 5.6	:	Land Use Distribution of Sachin GIDC	160
Figure 5.7	:	Land Use/Land cover - Pandessara GIDC	160
Figure 5.8	:	Land Use Distribution Of Pandessara GIDC	161

Figure 5.9	:	Land Use/Land Cover - Khatodara GIDC	161
Figure 5.10	:	Land Use Distribution of Khatodara GIDC	162
Figure 5.11	:	Land Use/Land Cover - Icchapore-Bhatpore GIDC	163
Figure 5.12	:	Land Use Distribution of Icchapore-Bhatpore GIDC	162
Figure 5.13	:	Land Use/Land Cover - Panoli GIDC	163
Figure 5.14	:	Land Use Distribution of Panoli GIDC	163
Figure 5.15	:	Land Use/Land Cover - Katargram GIDC	164
Figure 5.16	:	Land Use Distribution of Katargram GIDC	164
Figure 5.17	:	Land Use/Land Cover - Olpad GIDC	165
Figure 5.18	:	Land Use Distribution of Olpad GIDC	165
Figure 5.19	:	Land Use/Land Cover - Ankleshwar GIDC	165
Figure 5.20	:	Land Use Distribution of Ankleshwar GIDC	166
Figure 5.21	:	Land Use/Land Cover - Palej GIDC	167
Figure 5.22	:	Land Use Distribution of Palej GIDC	166
Figure 5.23	:	Land Use/Land Cover - Dahej GIDC	168
Figure 5.24	:	Land Use Distribution of Dahej GIDC	167
Figure 5.25	:	Land Use/Land Cover - Bharuch GIDC	168
Figure 5.26	:	Land Use Distribution of Bharuch GIDC	168
Figure 6.1	:	Methodology Flowchart	181
Figure 6.2	:	Land Use/Land Cover Map	191
Figure 6.3	:	Distance from Settlement and Industrial Belt	192
Figure 6.4	:	Distance from Roads and Railways	193
Figure 6.5	:	Distance from River	194
Figure 6.6	:	Distance from Pond	195



Figure 6.7	:	Water Depth	196
Figure 6.8	:	Land Elevation	197
Figure 6.9	:	Final Suitability Map	199