

Contents

<i>Acknowledgment</i>	3
<i>Extended Summary</i>	11
<i>Introduction</i>	15
1. Basic Characteristics of the Area	17
1.1 Location and Accessibility	17
1.2 Population, Settlements and Health Status	18
1.3 Land Use and Land Cover	26
2. Selected Physical and Geographical Settings	29
2.1 Geomorphology	29
2.2 Soil and Vegetation Cover	31
2.3 Climatic Characteristics	34
2.3.1 Climatic Zones and Measurements	34
2.3.2 Precipitation	43
2.4 Hydrography and Hydrology of the Area	50
2.4.1 Surface Water Network Development	51
2.4.2 River Flow Regime	53
2.4.3 Baseflow	65
2.4.4 Lakes	70
2.5 Water Balance	72
2.6 Drought and Climate Changes	72
3. Geological Settings	77
3.1 Previous Work	77
3.2 Stratigraphy	77
3.3 Lithology	78
3.3.1 Precambrian Metamorphic and Intrusive Rocks	78
3.3.2 Tertiary Volcanic Rocks	79
3.3.3 Quaternary Volcanic Rocks	80
3.3.4 Quaternary Sediments	82
3.4 Structures	82
3.5 Geological History	83
4. Hydrogeology	85
4.1 Water Point Inventory	85
4.2 Hydrogeological Classification/Characterization	90
4.3 Elements of the Hydrogeological System of the Area (Aquifers, Aquitards, Aquiclude)	91
4.3.1 Extensive and Moderately Productive Porous Aquifers	93
4.3.2 Extensive and Moderately Productive Fissured Aquifers	95
4.3.3 Extensive and Moderately Productive Mixed Porous and Fissured Aquifers	97
4.3.4 Extensive and Low Productive Fissured Aquifers	98
4.3.5 Formation Consisting of a Minor Fissured Aquifer with Local and Limited Groundwater Resources – Aquiclude	100
4.4 Hydrogeological Conceptual Model	100
4.5 Annual Recharge in the Area	103
4.6 Thermal Groundwater	104
5. Hydrogeochemistry	111

5.1 Sampling and Analysis.....	111
5.2 Classification of Natural Waters.....	112
5.2.1 Rain Water.....	115
5.2.2 Surface Water.....	115
5.2.3 Groundwater.....	116
5.3 Water Quality.....	116
5.3.1 Domestic Use.....	116
5.3.2 Irrigation and Livestock Watering Use.....	118
5.3.3 Industrial Use.....	120
5.4 Mineral and Thermal Water.....	121
5.5 Fluoride Problem of the Groundwater at Rift Floor.....	123
5.6 Environmental Isotopes.....	125
6. Natural Resources of the Area.....	127
6.1 Geothermal Potential.....	127
6.2 Industrial Minerals.....	128
6.2.1 Clays.....	128
6.2.2 Volcanic Rocks.....	128
6.3 Agricultural Potential.....	128
6.4 Water Resources.....	128
6.4.1 Surface Water Resources Development.....	130
6.4.2 Groundwater Resources Development.....	130
6.5 Human and Land Use Resources and Development.....	133
6.6 Wind and Solar Energy Development.....	133
6.7 Environmental Problems and their Control / Management.....	133
6.8 Touristic Potential of the Area.....	136
<i>Conclusions.....</i>	<i>137</i>
<i>References.....</i>	<i>141</i>
Annex 1.....	145
Annex 2.....	173
Annex 3.....	187