**LIST OF FIGURES**

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fig. 1.1</td>
<td>Geographical division of Alappuzha district showing taluks</td>
<td>6</td>
</tr>
<tr>
<td>Fig. 1.2</td>
<td>A General view of the back waters of Alappuzha district</td>
<td>6</td>
</tr>
<tr>
<td>Fig. 1.3</td>
<td>Manimala River Basin</td>
<td>7</td>
</tr>
<tr>
<td>Fig. 1.4</td>
<td>Pamba River Basin</td>
<td>7</td>
</tr>
<tr>
<td>Fig. 1.5</td>
<td>Achenkovil River Basin</td>
<td>8</td>
</tr>
<tr>
<td>Fig. 1.6</td>
<td>Meenachil River Basin</td>
<td>8</td>
</tr>
<tr>
<td>Fig. 1.7</td>
<td>Muvattupuzha River Basin</td>
<td>8</td>
</tr>
<tr>
<td>Fig. 1.8</td>
<td>Water shed map of study area</td>
<td>9</td>
</tr>
<tr>
<td>Fig. 2.1</td>
<td>Subsurface geological section between Cochin and Warkallai</td>
<td>11</td>
</tr>
<tr>
<td>Fig. 2.2</td>
<td>Geological cross – section of the Quaternary formations along the coast</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>including laterite</td>
<td></td>
</tr>
<tr>
<td>Fig. 2.3</td>
<td>Subsurface geological section along the coastal belt of Kerala based on bore</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>hole data</td>
<td></td>
</tr>
<tr>
<td>Fig. 3.1</td>
<td>Village map of study area</td>
<td>16</td>
</tr>
<tr>
<td>Fig. 3.2</td>
<td>Geomorphological map of study area</td>
<td>16</td>
</tr>
<tr>
<td>Fig. 3.3</td>
<td>Geological map of Alappuzha district</td>
<td>17</td>
</tr>
<tr>
<td>Fig. 3.4</td>
<td>Geological map of Ambalappuzha taluk</td>
<td>17</td>
</tr>
<tr>
<td>Fig. 3.5</td>
<td>Lithostratigraphy and hydrological cross section of the study area</td>
<td>17</td>
</tr>
<tr>
<td>Fig. 3.6</td>
<td>Soil map of study area</td>
<td>20</td>
</tr>
<tr>
<td>Fig. 3.7</td>
<td>Drainage map of study area</td>
<td>21</td>
</tr>
<tr>
<td>Fig. 4.1</td>
<td>Location map of observation wells</td>
<td>23</td>
</tr>
<tr>
<td>Fig. 4.2</td>
<td>Hydrograph of nine open wells in the study area</td>
<td>25</td>
</tr>
<tr>
<td>Fig. 4.3</td>
<td>Depth to water level map of pre monsoon period</td>
<td>26</td>
</tr>
<tr>
<td>Fig. 4.4</td>
<td>Depth of water level map of monsoon period</td>
<td>26</td>
</tr>
<tr>
<td>Fig. 4.5</td>
<td>Depth to water level map of post monsoon period</td>
<td>27</td>
</tr>
<tr>
<td>Fig. 4.6</td>
<td>Hydrograph of open well (CGWB – 02) at Kattoor</td>
<td>28</td>
</tr>
<tr>
<td>Fig. 4.7</td>
<td>Graph showing variation in water level during the study period.</td>
<td>29</td>
</tr>
<tr>
<td>Fig. 4.8</td>
<td>Rain fall / water level relationship of Mararikulam dug well</td>
<td>30</td>
</tr>
<tr>
<td>Fig. 4.9</td>
<td>Rain fall / water level relationship of Purakkad dug well</td>
<td>31</td>
</tr>
<tr>
<td>Fig. 4.10</td>
<td>Vector map showing flow direction of water in the pre monsoon period</td>
<td>33</td>
</tr>
<tr>
<td>Fig. 4.11</td>
<td>Vector map showing flow direction of water in the monsoon period</td>
<td>33</td>
</tr>
<tr>
<td>Fig. 4.12</td>
<td>Vector map showing flow direction of water in the post monsoon period</td>
<td>34</td>
</tr>
<tr>
<td>Fig. 5.1</td>
<td>Location map of open wells</td>
<td>35</td>
</tr>
</tbody>
</table>
Fig. 5.2. Location map of tube wells

Fig. 5.3. Zonation map of pH in the study area (pre monsoon)

Fig. 5.4. Zonation map of pH in the study area (monsoon)

Fig. 5.5. Zonation map of pH in the study area (post monsoon)

Fig. 5.6. Time series graph of pH in the study area (open wells)

Fig. 5.7. Time series graph of pH in the study area (open wells)

Fig. 5.8. Time series graph of pH in the study area (open wells)

Fig. 5.9. Graph showing average value of pH of each open well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.10. Graph showing average value of pH of open wells QS-04, QS-08, QS-19

Fig. 5.11 Histogram of pH in the study area

Fig. 5.12. Time series graph of pH in the study area (tube wells)

Fig. 5.13. Time series graph of pH in the study area (tube wells)

Fig. 5.14. Graph showing average value of pH of each tube well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.15. Zonation map of TDS in the study area (pre monsoon)

Fig. 5.16. Zonation map of TDS in the study area (monsoon)

Fig. 5.17. Zonation map of TDS in the study area (post monsoon)

Fig. 5.18. Time series graph of TDS in the study area (open wells)

Fig. 5.19. Time series graph of TDS in the study area (open wells)

Fig. 5.20. Time series graph of TDS in the study area (open wells)

Fig. 5.21. Time series graph of TDS in the study area (tube wells)

Fig. 5.22. Graph showing average value of TDS in open wells QS-04, QS-08, QS-19

Fig. 5.23. Histogram of TDS in the study area

Fig. 5.24. Graph showing average value of TDS of each open well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.25. Time series graph of TDS in the study area (tube wells)

Fig. 5.26. Graph showing average value of TDS of each tube well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.27. Zonation map of Cl in the study area (pre monsoon)

Fig. 5.28. Zonation map of Cl in the study area (monsoon)

Fig. 5.29. Zonation map of Cl in the study area (post monsoon)

Fig. 5.30. Time series graph of Cl in the study area (open wells)

Fig. 5.31. Time series graph of Cl in the study area (open wells)

Fig. 5.32. Time series graph of Cl in the study area (open wells)
Fig. 5.33. Graph showing average value of Cl of each open well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.34. Graph showing average value of Cl of open wells QS-04, QS-08, QS-19

Fig. 5.35. Histogram of Cl in the study area

Fig. 5.36. Time series graph of Cl in the study area (tube wells)

Fig. 5.37. Time series graph of Cl in the study area (tube wells)

Fig. 5.38. Graph showing average value of Cl of each tube well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.39. Zonation map of Ca in the study area (pre monsoon)

Fig. 5.40. Zonation map of Ca in the study area (monsoon)

Fig. 5.41. Zonation map of Ca in the study area (post monsoon)

Fig. 5.42. Time series graph of Ca in the study area (open wells)

Fig. 5.43. Time series graph of Ca in the study area (open wells)

Fig. 5.44. Time series graph of Ca in the study area (open wells)

Fig. 5.45. Graph showing average value of Ca of each open well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.46. Graph showing average value of Ca of open wells QS-04, QS-08, QS-19

Fig. 5.47. Histogram of Ca in the study area

Fig. 5.48. Time series graph of Ca in the study area (tube wells)

Fig. 5.49. Graph showing average value of Ca of each tube well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.50. Time series graph of Ca in the study area (tube wells)

Fig. 5.51. Zonation map of Na in the study area (pre monsoon)

Fig. 5.52. Zonation map of Na in the study area (monsoon)

Fig. 5.53. Zonation map of Na in the study area (post monsoon)

Fig. 5.54. Time series graph of Na in the study area (open wells)

Fig. 5.55. Time series graph of Na in the study area (open wells)

Fig. 5.56. Time series graph of Na in the study area (open wells)

Fig. 5.57. Graph showing average value of Na of each open well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.58. Graph showing average value of Na of open wells QS-04, QS-08, QS-19

Fig. 5.59. Histogram of Na in the study area

Fig. 5.60. Time series graph of Na in the study area (tube wells)

Fig. 5.61. Time series graph of Na in the study area (tube wells)
Fig. 5.62. Graph showing average value of Na of each tube well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.63. Zonation map of fluoride in the study area (pre monsoon)

Fig. 5.64. Zonation map of fluoride in the study area (monsoon)

Fig. 5.65. Zonation map of fluoride in the study area (post monsoon)

Fig. 5.66. Time series graph of fluoride in the study area (open wells)

Fig. 5.67. Time series graph of fluoride in the study area (open wells)

Fig. 5.68. Time series graph of fluoride in the study area (open wells)

Fig. 5.69. Graph showing average value of fluoride of each open well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.70. Graph showing average value of fluoride of open wells QS-04, QS-08, QS-19

Fig. 5.71. Histogram of fluoride in the study area

Fig. 5.72. Time series graph of fluoride in the study area (tube wells)

Fig. 5.73. Time series graph of fluoride in the study area (tube wells)

Fig. 5.74. Graph showing average value of fluoride of each tube well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.75. Zonation map of Fe in the study area (pre monsoon)

Fig. 5.76. Zonation map of Fe in the study area (monsoon)

Fig. 5.77. Zonation map of Fe in the study area (post monsoon)

Fig. 5.78. Time series graph of Fe in the study area (open wells)

Fig. 5.79. Time series graph of Fe in the study area (open wells)

Fig. 5.80. Time series graph of Fe in the study area (open wells)

Fig. 5.81. Graph showing average value of Fe of each open well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 5.82. Graph showing average value of Fe of open wells QS-04, QS-08, QS-19

Fig. 5.83. Histogram of Fe in the study area

Fig. 5.84. Time series graph of Fe in the study area (tube wells)

Fig. 5.85. Time series graph of Fe in the study area (tube wells)

Fig. 5.86. Graph showing average value of Fe of each tube well from 1/4/2005 to 31/1/2007 and its comparison with the study area average

Fig. 6.1. Langlier Index Map showing areas with scale formation in water in the study area (positive values shows scale formation)

Fig. 6.2. Langlier Index contours demarcating scale formation areas and non scale formation areas

Fig. 6.3. Chloride – bicarbonate ratio showing salinity

Fig. 6.4. Chloride – bicarbonate contours demarcating salinity in the study area
Fig. 6.5. Corrossivity ratio showing corrosive areas
Fig. 6.6. Corrossivity contours demarcating corrosive areas in the study area.
Fig. 6.7. Water quality index for June 2005
Fig. 6.8. Water quality index for June 2006
Fig. 6.9. Piper diagram showing classification of water types
Fig. 6.10. Piper diagram showing classification of water types in the study area
Fig. 6.11. Stiff diagram showing variations in cation and anions during different periods.
Fig. 6.12. Wilcox diagram showing sodium hazard in the study area
Fig. 6.13. Box Whisker diagram showing chloride variation in the study area
Fig. 7.1. Histogram of fluoride in open wells of the study area
Fig. 7.2. Histogram of fluoride in tube wells of the study area
Fig. 7.3. Graph showing variation of fluoride in different well sites of the study area
Fig. 7.4. Water types in the study area during the month of May 2006
Fig. 7.5. Pie diagram showing different parameters during May 2006 for well no. QS 12
Fig. 7.6. Pie diagram showing different parameters during May 2006 for well no. QS 6
Fig. 8.1. Graph showing inverse relationship of fluoride with calcium from the water samples of the study area.
Fig. 8.2. Graph showing inverse relationship of fluoride with sodium from the water samples of the study area.
Fig. 8.3. Graph showing inverse relationship of fluoride with bicarbonate from the water samples of the study area.
Fig. 8.4. Graph showing inverse relationship of fluoride with pH from the water samples of the study area.