CHAPTER-IV

RESULTS

Abiotic Factors

pH

The pH of Aravatagi pond varied from 7.2 to 7.9. The maximum of 7.9 was recorded in December & June and the minimum 7.2 was recorded in January during April 2012 to March 2013. In the same pond the maximum of 7.9 was recorded in December and the minimum of 7.2 was recorded in October during April 2013 to March 2014.

The pH of Madikoppa pond varied from 7.0 to 8.1. The maximum of 8.1 was recorded in July and the minimum of 7.0 was recorded in March during April 2012 to March 2013. In the same pond, the maximum 8.0 was recorded in December & July and the minimum of 7.1 in March during April 2013 to March 2014.

The pH of Dori pond varied from 7.0 to 8.1. The maximum of 8.0 was recorded in August and minimum of 7.0 was recorded in January during April 2012 to March 2013. In the same pond the maximum of 8.1 was recorded in August and minimum of 7.2 was recorded in January during April 2013 to March 2014.

The pH of Benachi pond varied from 6.7 to 7.8. The maximum of 7.8 was recorded in November and minimum of 6.7 was recorded in January during April 2012 to March 2013. In
same pond the maximum of 7.7 was recorded in December, April & October and minimum of 7.5 was recorded in July & September during April 2013 to March 2014.

**Conductivity**

The conductivity of Aravatagi pond varied from 12μScm⁻¹ to 28μScm⁻¹. The maximum of 22μScm⁻¹ was recorded in April and minimum of 12μScm⁻¹ was recorded in November and September during April 2012 to March 2013. In same pond the maximum of 28μScm⁻¹ was recorded in December and minimum of 12μScm⁻¹ was recorded in October during April 2013 to March 2014.

The conductivity of Madikoppa pond varied from 23μScm⁻¹ to 38μScm⁻¹. The maximum of 35μScm⁻¹ was recorded in April and minimum of 23μScm⁻¹ was recorded in November during April 2012 to March 2013. In the same pond the maximum of 38μScm⁻¹ was recorded in November and minimum of 26μScm⁻¹ was recorded in January during April 2013 to March 2014.

The conductivity of Dori pond varied from 18μScm⁻¹ to 26μScm⁻¹. The maximum of 25μScm⁻¹ was recorded in March and minimum of 18μScm⁻¹ was recorded in November and December during April 2012 to March 2013 and in the same pond the maximum of 26μScm⁻¹ was recorded in November and minimum of 20μScm⁻¹ was recorded in June during April 2013 to March 2014.
The conductivity of Benachi pond varied from 11μScm\(^{-1}\) to 25μScm\(^{-1}\). The maximum of 25μScm\(^{-1}\) was recorded in January and minimum of 11μScm\(^{-1}\) was recorded in November and December during April 2012 to March 2013 and in the same pond, the maximum of 25μScm\(^{-1}\) was recorded in January and minimum of 15μScm\(^{-1}\) was recorded in September during April 2013 to March 2014.

**Turbidity**

The turbidity of Aravatagi pond varied from 5 to 80. The maximum of 80 was recorded in September and minimum of 5 was recorded in January during April 2012 to March 2013. In same pond the maximum of 70 was recorded in September and minimum of 40 was recorded in February during April 2013 to March 2014.

The turbidity of Madikoppa pond varied from 20 to 72. The maximum of 70 was recorded in September and minimum of 20 was recorded in March during April 2012 to March 2013. In the same pond maximum of 72 was recorded in November & September and minimum of 30 was recorded in April during April 2013 to March 2014.

The turbidity of Dori pond varied from 29 to 60. The maximum of 60 was recorded in March & July and minimum of 30 was recorded in October during April 2012 to March 2013 and in the same pond the maximum of 60 was recorded in
September and minimum of 29 was recorded in May during April 2013 to March 2014.

The turbidity of Benachi pond varied from 4 to 11. The maximum of 11 was recorded in October and minimum of 4 was recorded in February and March during April 2012 to March 2013. In the same pond the maximum of 10 was recorded in November & October and minimum of 5 was recorded in March during April 2013 to March 2014.

**TDS**

The total dissolved solids of Aravatagi pond varied from 70 mg/l to 180 mg/l. The maximum of 132 mg/l was recorded in the month of April and minimum of 70 mg/l in the month of September during April 2012 to March 2013. In the same pond the maximum of 180 mg/l was recorded in the month of December and minimum of 80 mg/l was recorded in the month of September during April 2013 to March 2014.

The total dissolved solids of Madikoppa pond varied from 100 mg/l to 240 mg/l. The maximum of 212 mg/l was recorded in the month of April and minimum of 100 mg/l in the month of January during April 2012 to March 2013. In the same pond the maximum of 240 mg/l was recorded in the month of November and 100 mg/l in the month of January during April 2013 to March 2014.

The total dissolved solids of Dori pond varied from 105 mg/l to 156 mg/l. The maximum of 150 mg/l recorded in the
month of March and minimum of 105 mg/l was recorded in the month of November during April 2012 to March 2013. In the same pond the maximum of 156 mg/l was recorded in the month of November and minimum of 120 mg/l was recorded in the month of June during April 2013 to March 2014.

The total dissolved solids of Benachi pond varied from 63 mg/l to 151 mg/l. The maximum of 151 mg/l is recorded in the month of January and minimum of 63 mg/l was recorded in the month of November and December during April 2012 to March 2013. In the same pond the maximum of 151 mg/l is recorded in the month of January and minimum of 82 mg/l was recorded in the month of September during April 2013 to March 2014.

**Total Hardness**

The total hardness of Aravatagi pond varied from 50 mg/l to 90 mg/l. The maximum of 80 mg/l was recorded in the month of February and minimum of 60 mg/l was recorded in the month of November during April 2012 to March 2013. In the same pond the maximum of 90 mg/l was recorded in the month of January and minimum of 50 mg/l was recorded in the month of November during April 2013 to March 2014.

The total hardness of Madikoppa pond varied from 70 mg/l to 120 mg/l. The maximum of 110 mg/l was recorded in the month of October and minimum of 70 mg/l was recorded in the month of January during April 2012 to March 2013. In the same pond the maximum of 120 mg/l was recorded in the month of
April and minimum of 80 mg/l was recorded in the month of January during April 2013 to March 2014.

The total hardness of Dori pond varied from 76 mg/l to 98 mg/l. The maximum of 98 mg/l was recorded in the month of September & December and minimum of 76 mg/l was recorded in the month of October during April 2012 to March 2013. In the same pond the minimum of 96 mg/l was recorded in the month of June & September and minimum of 80 mg/l was recorded in the month of October during April 2013 to March 2014.

The total hardness of Benachi pond varied from 63 mg/l to 91 mg/l. The maximum of 91 mg/l was recorded in the month of January and minimum of 63 mg/l was recorded in the month of November during April 2012 to March 2013. In the same pond the maximum of 91 mg/l was recorded in the month of January and minimum of 66 mg/l was recorded in the month of April during April 2013 to March 2014.

**Calcium**

The calcium of Aravatagi pond varied from 13.2 mg/l to 22.2 mg/l. The maximum of 19.0 mg/l was recorded in the month of March & October and minimum of 13.2 mg/l was recorded in the month of August during April 2012 to March 2013. In the same pond the maximum of 22.2 mg/l was recorded in the month of November and the minimum of 13.0 mg/l was recorded in the month of August during April 2013 to March 2014.
The calcium of Madikoppa pond varied from 16.9 mg/l to 23.9 mg/l. The maximum of 23.9 mg/l was recorded in the month of April and minimum of 16.9 mg/l was recorded in January during April 2012 to March 2013. In the same pond the maximum of 23.9 mg/l was recorded in the month of February and the minimum of 19.0 mg/l was recorded in the month of May during April 2013 to March 2014.

The calcium of Dori pond varied from 13.5 mg/l to 19.8 mg/l. The maximum of 19.8 mg/l was recorded in the month of December and minimum of 13.5 mg/l was recorded in the month of January during April 2012 to March 2013 and in the same pond the maximum of 18.0 mg/l was recorded in the month of March and minimum of 15.0 mg/l was recorded in the month of January during April 2013 to March 2014.

The calcium of Benachi pond varied from 12.2 mg/l to 22.0 mg/l. The maximum of 21.0 mg/l was recorded in the month of July and minimum of 12.2 mg/l was recorded in the month of November during April 2012 to March 2013 and in the same pond the maximum of 22.0 mg/l was recorded in the month of July and minimum of 13.1 mg/l was recorded in the month of February during April 2013 to March 2014.
Magnesium

The Magnesium content of Aravatagi pond varied from 4.9 mg/l to 9.6 mg/l. The maximum of 9.6 mg/l was recorded in the month of December and minimum of 4.9 mg/l was recorded in the month of April during April 2012 to March 2013. In the same pond the maximum of 9.6 mg/l was recorded in the month of February and minimum of 5.9 mg/l was recorded in the month of March during April 2013 to March 2014.

The Magnesium content of Madikoppa pond varied from 8.9 mg/l to 16.5 mg/l. The maximum of 16.5 mg/l was recorded in the month of September and minimum of 8.9 mg/l was recorded in the month of January during April 2012 to March 2013. In the same pond the maximum of 16.0 mg/l was recorded in the month of July and minimum of 10.0 mg/l in the month of February during April 2013 to March 2014.

The Magnesium content of Dori pond varied from 8.6 mg/l to 14.9 mg/l. The maximum of 14.2 mg/l was recorded in the month of September and minimum of 8.6 mg/l was recorded in the month of April during April 2012 to March 2013. In the same pond the maximum of 14.9 mg/l was recorded in the month of September and minimum of 9.2 mg/l was recorded in the month of March during April 2013 to March 2014.

The Magnesium content of Benachi pond varied from 6.3 mg/l to 15.8 mg/l. The maximum of 15.8 mg/l was recorded in the month of January and minimum of 6.3 mg/l was recorded in
the month of March during April 2012 to March 2013. In the same pond the maximum of 11.2 mg/l was recorded in the month of January and minimum of 7.0 mg/l was recorded in the month of March during April 2013 to March 2014.

**Chloride**

The chloride content of Aravatagi pond varied from 8.0 mg/l to 15.0 mg/l. The maximum of 13.0 mg/l was recorded in the month of March and minimum of 8.0 mg/l was recorded in the month of June during April 2012 to March 2013. In the same pond the maximum of 15.0 mg/l was recorded in the month of December and minimum of 8.0 mg/l was recorded in the month of July during April 2013 to March 2014.

The chloride content of Madikoppa pond varied from 15.0 mg/l to 40.0 mg/l. The maximum of 33.0 mg/l was recorded in the month of July and minimum of 15.0 mg/l was recorded in the month of March during April 2012 to March 2013. In the same pond the maximum of 40.0 mg/l was recorded in the month of December and minimum of 26.0 mg/l was recorded in the month of March during April 2013 to March 2014.

The chloride content of Dori pond varied from 10.0 mg/l to 20.0 mg/l. The maximum of 19.0 mg/l was recorded in the month of September and minimum of 10.0 mg/l was recorded in the month of December during April 2012 to March 2013. In the same pond the maximum of 20.0 mg/l was recorded in the month of November and minimum of 12.0 mg/l was recorded in
the month of December, January & April during April 2013 to March 2014.

The chloride content of Benachi pond varied from 7.0 mg/l to 17.0 mg/l. The maximum of 13.0 mg/l was recorded in the month of January, March & October and minimum of 7.0 mg/l was recorded in the month of December during April 2012 to March 2013. In the same pond the maximum of 17.0 mg/l was recorded in the month of November and 10.8 mg/l was recorded in the month of September during April 2013 to March 2014.

**Sulphate**

The sulphate content of Aravatagi pond varied from 6.0 mg/l to 12.0 mg/l. The maximum of 11.0 mg/l was recorded in the month of March and minimum of 7.0 mg/l was recorded in the month October during April 2012 to March 2013. In the same pond the maximum of 12.0 mg/l was recorded in the month of January and minimum of 6.0 mg/l was recorded in the month of October during April 2013 to March 2014.

The sulphate content of Madikoppa pond varied from 5.0 mg/l to 16.0 mg/l. The maximum of 16.0 mg/l was recorded in the month of March and minimum of 6.0 mg/l was recorded in the month of June during April 2012 to March 2013. In the same pond the maximum of 15.0 mg/l was recorded in the month of March and minimum of 5.0 mg/l was recorded in the month of June during April 2013 to March 2014.
The sulphate content of Dori pond varied from 8.0 mg/l to 13.0 mg/l. The maximum content of 14.0 mg/l was recorded in the month of April and minimum of 9.0 mg/l was recorded in the month of November, February & June during April 2012 to March 2013. In the same pond the maximum of 13.0 mg/l was recorded in the month of September and minimum of 8.0 mg/l was recorded in the month of June during April 2013 to March 2014.

The sulphate content of Benachi pond varied from 7.0 mg/l to 15.0 mg/l. The maximum of 15.0 mg/l was recorded in the month of January and minimum of 7.0 mg/l was recorded in the month of February during April 2012 to March 2013. In the same pond the maximum of 13.0 mg/l was recorded in the month of January and minimum of 8.0 mg/l was recorded in the month of November during April 2013 to March 2014.

**Fluoride**

The fluoride content of Aravatagi pond varied from Nil to 0.2 mg/l. The maximum content of 0.2 mg/l was recorded in the month of February, April & July and minimum of Nil is recorded in the month of December & September during April 2012 to March 2013. In the same pond the maximum of 0.2 mg/l was recorded in the month of November, February, May & July and minimum of 0.1 mg/l was recorded in the month of December, January, March, April, June, August & September during April 2013 to March 2014.
The fluoride content of Madikoppa pond varied from 0.1 mg/l to 0.2 mg/l. The maximum of 0.2 mg/l was recorded in the month of January, March, May, August & October and minimum of 0.1 mg/l is recorded in the month of November, December, February, April, June, July & September during April 2012 to March 2013. In the same pond the maximum of 0.2 mg/l was recorded in the month of December, March, May, August & October and minimum of 0.1 mg/l was recorded in the month of November, January, February, April, June, July & September during April 2013 to March 2014.

The fluoride content of Dori pond varied from 0.1 mg/l to 0.2 mg/l. The maximum of 0.2 mg/l was recorded in the month of January, February, July & October and minimum of 0.1 mg/l was recorded in the month of November, December, March, April, May, June, August & September during April 2012 to March 2013 and in the same pond the maximum of 0.2 mg/l was recorded in the months of January, February, May, July & September and minimum of 0.1 mg/l was recorded in the months of November, December, March, April, June, August & October during April 2013 to March 2014.

The fluoride content of Benachi pond varied from 0.1 mg/l to 0.3 mg/l. The maximum of 0.3 mg/l was recorded in the month of March and minimum of 0.1 mg/l was recorded in the months of November, January, May, August & September during April 2012 to March 2013. In the same pond the maximum of 0.3
mg/l was recorded in the months of December & August and minimum of 0.1 mg/l was recorded in the months of February, April, June & October during April 2013 to March 2014.

**Nitrate**

The nitrate content of Aravatagi pond varied from 0.5 mg/l to 2.0 mg/l. The maximum of 2.0 mg/l was recorded in the months of December, January & July and minimum of 1.0 mg/l was recorded in the month of October during April 2012 to March 2013. In the same pond the maximum of 2.0 mg/l was recorded in the month of December and minimum of 0.5 mg/l was recorded in the month of April during April 2013 to March 2014.

The nitrate content of Madikoppa pond varied from 0.3 mg/l to 2.0 mg/l. The maximum of 2.0 mg/l was recorded in the month of December and minimum of 0.3 mg/l was recorded in the month of September during April 2012 to March 2013. In the same pond the maximum of 1.8 mg/l was recorded in the month of March and minimum of 0.3 mg/l was recorded in the month of September during April 2013 to March 2014.

The nitrate content of Dori pond varied from 0.8 mg/l to 2.2 mg/l. The maximum of 2.2 mg/l was recorded in the month of December and minimum of 0.8 mg/l was recorded in the month of March during April 2012 to March 2013. In the same pond the maximum of 2.2 mg/l was recorded in the month of
May and minimum of 1.0 mg/l was recorded in the month of February during April 2013 to March 2014.

The nitrate content of Benachi pond varied from 1.2 mg/l to 3.1 mg/l. The maximum of 3.1 mg/l was recorded in the month of April and minimum of 1.2 mg/l was recorded in the month of June during April 2012 to March 2013. In the same pond the maximum of 3.1 mg/l was recorded in the month of August and minimum of 1.2 mg/l was recorded in the month of November during April 2013 to March 2014.

**Iron**

The iron content of Aravatagi pond varied from 0.1 mg/l to 0.3 mg/l. The maximum of 0.3 mg/l was recorded in the month of December & April and minimum of 0.1 mg/l was recorded in the month of February, May, July & October during April 2012 to March 2013. In the same pond the maximum of 0.3 mg/l was recorded in the month of December & August and minimum of 0.1 mg/l was recorded in the month of February, April, June & October during April 2013 to March 2014.

The iron content of Madikoppa pond varied from 0.1 mg/l to 0.3 mg/l. The maximum of 0.3 mg/l was recorded in the month of November & April and minimum of 0.1 mg/l was recorded in the months of March, June, August & September during April 2012 to March 2013. In the same pond the maximum of 0.3 mg/l was recorded in the month of November and minimum of 0.1 mg/l was recorded in the month of
December, February, April, June, September & October during April 2013 to March 2014.

The iron content of Dori pond varied from 0.1 mg/l to 0.3 mg/l. The maximum of 0.3 mg/l was recorded in the month of November, February, June & September and minimum of 0.1 mg/l was recorded in the month of January, May, July & August during April 2012 to March 2013. In the same pond the maximum of 0.3 mg/l was recorded in the month of February, May & September and minimum of 0.1 mg/l was recorded in the month of November, December, April & July during April 2013 to March 2014.

The iron content of Benachi pond varied from 0.1 mg/l to 0.4 mg/l. The maximum of 0.4 mg/l was recorded in the month of April and minimum of 0.1 mg/l was recorded in the month of January, July & August during April 2012 to March 2013. In the same pond the maximum of 0.2 mg/l was recorded in the month of November, January, March, April, June, August & October and minimum of 0.1 mg/l was recorded in the month of December, February, May & July during April 2013 to March 2014.

**Phosphate**

The phosphate content of Aravatagi pond varied from 0.20 mg/l to 0.34 mg/l. The maximum of 0.34 mg/l was recorded in the month of October and minimum of 0.22 mg/l was recorded in the month of December & April during April 2012 to March 2014.
2013. In the same pond the maximum of 0.32 mg/l was recorded in the month of October and minimum of 0.20 mg/l was recorded in the month of April during April 2013 to March 2014.

The phosphate content of Madikoppa pond varied from 0.1 mg/l to 0.3 mg/l. The maximum of 0.3 mg/l was recorded in the month of November, January, February, March, June, July & October and minimum of 0.2 mg/l was recorded in the month of December, April, May & August during April 2012 to March 2013. In the same pond the maximum of 0.3 mg/l was recorded in the month of December & June and minimum of 0.1 mg/l was recorded in the months of April & August during April 2013 to March 2014.

The phosphate content of Dori pond varied from 0.2 mg/l to 0.4 mg/l. The maximum of 0.4 mg/l was recorded in the month of April and minimum of 0.2 mg/l was recorded in the month of December & October during April 2012 to March 2013. In the same pond the maximum of 0.4 mg/l was recorded in the month of December, April, June & September and minimum of 0.2 mg/l was recorded in the month of February during April 2013 to March 2014.

The phosphate content of Benachi pond varied from 0.14 mg/l to 0.40 mg/l. The maximum of 0.40 mg/l was recorded in the month of January and minimum of 0.14 mg/l was recorded in the month of November during April 2012 to March 2013. In the same pond the maximum of 0.30 mg/l was recorded in the
month of November, December, March, May, July, August &
October and maximum of 0.2 mg/l was recorded in the month of
January, February, April, June & September during April 2013
to March 2014.

**Alkalinity**

The alkalinity content of Aravatagi pond varied from 48.0
mg/l to 68.0 mg/l. The maximum of 63.0 mg/l was recorded in
the month of September and 48.0 mg/l was recorded in the
month of November during April 2012 to March 2013. In the
same pond the maximum of 68.0 mg/l was recorded in the
month of July and minimum of 56.0 mg/l was recorded in the
month of November & October during April 2013 to March 2014.

The alkalinity content of Madikoppa pond varied from 60.0
mg/l to 95.0 mg/l. The maximum of 95.0 mg/l was recorded in
the month of September and minimum of 60.0 mg/l was
recorded in the month of January during April 2012 to March
2013. In the same pond the maximum of 90.0 mg/l was recorded
in the month of April and minimum of 70.0 mg/l was recorded in
the month of January during April 2013 to March 2014.

The alkalinity content of Dori pond varied from 58.0 mg/l
to 74.0 mg/l. The maximum of 72.0 mg/l was recorded in the
months of January and minimum of 58.0 mg/l was recorded in
the month of December during April 2012 to March 2013. In the
same pond the maximum of 74.0 mg/l was recorded in the
month of July and Minimum of 64.0 mg/l was recorded in the
month of January & October during April 2013 to March 2014.

The alkalinity content of Benachi pond varied from 45.0
mg/l to 73.0 mg/l. The maximum of 73.0 mg/l was recorded in
the month of January and minimum of 45.0 mg/l was recorded
in the month of February during April 2012 to March 2013. In
the same pond the maximum of 63.0 mg/l was recorded in the
month of December and minimum of 51.0 mg/l was recorded in
the month of March during April 2013 to March 2014.

**Carbon Dioxide**

The carbon dioxide content of Aravatagi pond varied from
2.0 mg/l to 6.0 mg/l. The maximum of 5.0 mg/l was recorded in
the month of July and minimum of 2.0 mg/l was recorded in the
month of February & September during April 2012 to March
2013. In the same pond the maximum of 6.0 mg/l was recorded
in the month of March and minimum of 2.0 mg/l was recorded in
the month of May & September during April 2013 to March
2014.

The carbon dioxide content of Madikoppa pond varied from
Nil to 6.0 mg/l. The maximum of 6.0 mg/l was recorded in the
month of December and minimum of Nil was recorded in the
month of June during April 2012 to March 2013. In the same
pond the maximum of 3.0 mg/l was recorded in the month of
February & June and minimum of Nil was recorded in the month
of August during April 2013 to March 2014.
The carbon dioxide content of Dori pond varied from 0.1 mg/l to 6.0 mg/l. The maximum of 6.0 mg/l was recorded in the month of December and minimum of 2.0 mg/l was recorded in the month of September during April 2012 to March 2013. In the same pond the maximum of 5.0 mg/l was recorded in the month of May and minimum of 1.0 mg/l was recorded in the month of April during April 2013 to March 2014.

The carbon dioxide content of Benachi pond varied from 2.0 mg/l to 9.0 mg/l. The maximum of 9.0 mg/l was recorded in the month of December and minimum of 2.0 mg/l was recorded in the month of February during April 2012 to March 2013. In the same pond the maximum of 5.0 mg/l was recorded in the month of January and minimum of 2.0 mg/l was recorded in the month of May during April 2013 to March 2014.

**Dissolved Oxygen**

The dissolved oxygen content of Aravatagi pond varied from 6.0 mg/l to 7.6 mg/l. The maximum of 7.6 mg/l was recorded in the month of May and minimum of 7.0 mg/l was recorded in the month of August during April 2012 to March 2013. In the same pond the maximum of 7.6 mg/l was recorded in the month of November and minimum of 6.9 mg/l was recorded in the month of April & August during April 2013 to March 2014.

The dissolved oxygen content of Madikopa pond varied from 7.2 mg/l to 7.9 mg/l. The maximum of 7.9 mg/l was recorded in the month of March and minimum of 7.2 mg/l was
recorded in the month of November during April 2012 to March
2013. In the same pond the maximum of 7.9 mg/l was recorded
in the month of March & August and minimum of 7.4 mg/l was
recorded in the month of November during April 2013 to March
2014.

The dissolved oxygen content of Dori pond varied from 6.9
mg/l to 7.9 mg/l. The maximum of 7.9 mg/l was recorded in the
month of December and minimum of 6.9 mg/l was recorded in
the month of April during April 2012 to March 2013. In the same
pond the maximum of 7.9 mg/l was recorded in the month of
July and minimum of 7.2 mg/l was recorded in the month of
January & April during April 2013 to March 2014.

The dissolved oxygen content of Benachi pond varied from
7.1 mg/l to 8.0 mg/l. The maximum of 8.0 mg/l was recorded in
the month of November & January and minimum of 7.1 mg/l
was recorded in the month of September during April 2012 to
March 2013. In the same pond the maximum of 7.7 mg/l was
recorded in the month of May and minimum of 7.2 mg/l was
recorded in the month of January during April 2013 to March
2014.

**BOD (Biological Oxygen Demand)**

The BOD of Aravatagi pond varied from 1.0 mg/l to 4.0
mg/l. The maximum of 4.0 mg/l was recorded in the month of
May and minimum of 1.0 mg/l was recorded in the month of
November & August during April 2012 to March 2013. In the
same pond the maximum of 4.0 mg/l was recorded in the month of November, May & October and minimum of 1.0 mg/l was recorded in the month of February & August during April 2013 to March 2014.

The BOD content of Madikoppa pond varied from 2.0 mg/l to 5.0 mg/l. The maximum of 5.0 mg/l was recorded in the month of May & September and minimum of 2.0 mg/l was recorded in the month of January during April 2012 to March 2013. In the same pond the maximum of 5.0 mg/l was recorded in the month of March & June and minimum of 2.0 mg/l was recorded in the month of December, April, August & October during April 2013 to March 2014.

The BOD content of Dori pond varied from 3.0 mg/l to 8.0 mg/l. The maximum of 8.0 mg/l was recorded in the month of April and minimum of 3.0 mg/l was recorded in the month of December during April 2012 to March 2013 and in the same pond the maximum of 8.0 mg/l was recorded in the month of April and minimum of 3.0 mg/l was recorded in the month of November during April 2013 to March 2014.

The BOD content of Benachi pond varied from 3.0 mg/l to 9.0 mg/l. The maximum of 9.0 mg/l was recorded in the month of March and minimum of 3.0 mg/l was recorded in the month of August during April 2012 to March 2013. In the same pond the maximum of 9.0 mg/l was recorded in the month of March and
minimum of 3.0 mg/l was recorded in the month of August & October during April 2013 to March 2014.

COD (Chemical Oxygen Demand):

    The COD content of Aravatagi pond varied from 5.0 mg/l to 15.0 mg/l. The maximum of 15.0 mg/l was recorded in the month of March and minimum of 5.0 mg/l was recorded in the month of January & August during April 2012 to March 2013. In the same pond the maximum of 10.0 mg/l was recorded in the month of December, March & May and minimum of 5.8 mg/l was recorded in the month of August during April 2013 to March 2014.

    The COD content of Madikoppa pond varied from 5.0 mg/l to 20.0 mg/l. The maximum of 20.0 mg/l was recorded in the month of May and minimum of 6.0 mg/l was recorded in the month of December & September during April 2012 to March 2013. In the same pond the maximum of 12.0 mg/l was recorded in the month of March and minimum of 5.0 mg/l was recorded in the month of August during April 2013 to March 2014.

    The COD content of Dori pond varied from 6.0 mg/l to 18.0 mg/l. The maximum of 14.0 mg/l was recorded in the month of May & August and minimum of 6.0 mg/l was recorded in the month of November during April 2012 to March 2013. In the same pond the maximum of 18.0 mg/l was recorded in the month of May and minimum of 8.0 mg/l was recorded in the month of October during April 2013 to March 2014.
The COD content of Benachi pond varied from 7.0 mg/l to
21.0 mg/l. The maximum of 21.0 mg/l was recorded in the
month of March and minimum of 7.0 mg/l was recorded in the
month of August during April 2012 to March 2013. In the same
pond the maximum of 21.0 mg/l was recorded in the month of
March and minimum of 8.0 mg/l was recorded in the month of
August during April 2013 to March 2014.

MPN

The MPN content of Aravatagi pond varied from 250.0 to
1800.0. The maximum of 1800.0 was recorded in the month of
August and minimum of 250.0 was recorded in the month of
January during April 2012 to March 2013. In the same pond the
maximum of 1800.0 was recorded in the month of March and
minimum of 850.0 was recorded in the month of May during
April 2013 to March 2014.

The MPN content of Madikoppa pond varied from 250.0 to
1800.0. The maximum of 1800.0 was recorded in the month of
January and minimum of 250.0 was recorded in the month of
June during April 2012 to March 2013. In the same pond the
maximum of 1800.0 was recorded in the month of March and
minimum of 850.0 was recorded in the month of May during
April 2013 to March 2014.

The MPN content of Dori pond varied from 250.0 to 1800.0.
The maximum of 1800.0 was recorded in the month of May and
minimum of 250.0 was recorded in the month of February during
April 2012 to March 2013. In the same pond the maximum of 1800.0 was recorded in the month of January and minimum of 800.0 was recorded in the month of March during April 2013 to March 2014.

The MPN content of Benachi pond varied from 185.0 to 1800.0. The maximum of 910.0 was recorded in the month of April and minimum of 185.0 was recorded in the month of December during April 2012 to March 2013 and in the same pond the maximum of 1800.0 was recorded in the month of November and minimum of 310.0 was recorded in the month of January during April 2013 to March 2014.

**Water Temperature**

The water temperature of Aravatagi pond varied from 28.0°C to 29.5°C. The maximum of 29.4°C was recorded in the month of May and minimum of 28.0°C was recorded in the month of December during April 2012 to March 2013. In the same pond the maximum of 29.5°C was recorded in the month of May and minimum of 28.2°C was recorded in the month of November, December & October during April 2013 to March 2014.

The water temperature of Madikoppa pond varied from 25.2°C to 26.5°C. The maximum of 26.4°C was recorded in the month of April and minimum of 25.3°C was recorded in the month of December during April 2012 to March 2013. In the
same pond the maximum 26.5°C was recorded in the month of April and minimum of 25.2°C was recorded in the month of November & October during April 2013 to March 2014.

The water temperature of Dori pond varied from 26.8°C to 27.7°C. The maximum of 27.6°C was recorded in the month of April and minimum of 26.8°C was recorded in the month of August during April 2012 to March 2013. In the same pond the maximum of 27.7°C was recorded in the month of May and minimum of 27.0°C was recorded in the months of October during April 2013 to March 2014.

The water temperature of Benachi pond varied from 29.0°C to 30.2°C. The maximum of 30.2°C was recorded the month of April and minimum of 29.0°C was recorded in the month of September during April 2012 to March 2013. In same pond the maximum of 30.2°C was recorded in the month of May and minimum of 29.4°C was recorded in the month of November during April 2013 to March 2014.

**Zooplanktons**

Zooplanktons are microscopic free floating organisms occurred in all natural water bodies. They are a major mode of energy source between phytoplankton and other aquatic animals. They occupy an intermediate position in the aquatic food web (Altaff, 2004).
Rotifers, Cladoceras, Copepodas and Ostracodas constitute the major groups of zooplanktons. Zooplankton provides fish with nutrients since fish required proteins, fats, carbohydrates, mineral salts and water in the right proportion. The fresh water forms of zooplankton are generally smaller in size and all represented by fewer animal phyla than their marine counterparts. Zooplankton study is of necessity in fisheries; aquaculture and paleo limnological research. They are globally recognized as pollution indicator organisms in the aquatic environment.

Zooplankton has been recommended as regional bio-indicator of pond eutrophication, acidification and disturbances by agriculture.

Different environmental factors that determine the characteristics of water have great importance upon the growth and the abundance of zooplankton.

About 1700 species of rotifers have been described from the different parts of the world and 500 species (only 330 species belonging to 63 genera and 25 families have so far been authenticated) was described from Indian water bodies. (Arora and Mehra, 2003; Kiran et al., 2007)

Although zooplanktons are usually considered to be good indicators of environmental changes and have a fundamental role in energy flow and nutrient cycling in aquatic ecosystems, these organisms have been little studied in aquatic ecosystems
of Alnavar region, Dharwad Tq/District, Karnataka. Hence these potential value as indicators of alteration in the water quality of ponds in these regions needs to be assessed.

For qualitative analysis of zooplankton, samples were collected by sieving 50 liters of water through plankton hand net made up of nylon bolting cloth (68 μm pair size) for estimation. Samples were fixed in 4% formaldehyde and lugol’s solution. Zooplanktons identified to the greatest possible taxonomic level by using an optical microscope and referring to a specialized bibliography of (Sharma 2001) & (Patil & Goudar 1989). Zooplankton biodiversity of Aravatagi, Madikoppa, Dori & Benachi were represented by

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Pond</th>
<th>Rotifers</th>
<th>Cladocera</th>
<th>Copepod</th>
<th>Ostracoda</th>
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<tbody>
<tr>
<td>1</td>
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<td>23</td>
<td>12</td>
<td>06</td>
<td>02</td>
</tr>
<tr>
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<td>Madikoppa</td>
<td>14</td>
<td>07</td>
<td>02</td>
<td>01</td>
</tr>
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<td>Dori</td>
<td>21</td>
<td>09</td>
<td>07</td>
<td>03</td>
</tr>
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<td>4</td>
<td>Benachi</td>
<td>23</td>
<td>15</td>
<td>05</td>
<td>02</td>
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</tbody>
</table>

In the present work, Rotifer constituted the most dominant group in the pond contributing 23 of the total Zooplankton population followed by Cladocera 15, Copepoda 07 and Ostracoda 03. Presence of Brachionus species indicates that the pond is approaching towards eutrophication and is organically polluted. (Mugeed 2008), (Ahmad 2011) and (Mola 2011) they mentioned that Rotifers especially, Brachionus sp. are the major component of Zooplankton in eutrophic waterbodies.
Cladocerans comprised the food of fry, fingerlings and adults of many economically important and cultivable fish species. If food supply is enough Cladocerans usually level up high in number to dominate Zooplankton population (Ahmad, 2011). Cladocerans have also been reported to be reliable indicators of eutrophic nature of waterbodies (Sharma, 2001).

The eutrophication affects Zooplankton composition, shifting the dominance from large species (Copepoda) to smaller species (Rotifera) (El-shabrawy, 2000).

Ostracods are benthic in nature but become Planktonic as disturbances in water which brings them to surface.

Different species of Zooplankton showed their abundance according to the favourable condition, so they disappear in unfavourable conditions and reappeared on return of favourable condition.

Zooplankton constitutes important food item of many omnivorous and carnivorous fish. The larvae of carps feed mostly on Zooplankton. Zooplankton also plays a very important role in the food chain as they are in the second of the tropic level as primary consumers and also as contribution to the next tropic level.

Zooplankton communities are known to be highly susceptible to a wide range of factors like environmental changes, temporal abundance and seasonal variation and their diversity is a marker of water quality in trophic conditions in
cold temperate and tropical waters. Moreover they are also known to play a primary role in functioning and productivity of lake ecosystems and make up a major portion of its biomass. The structure and assemblage of Zooplankton communities is dependent on many physico-chemical and environmental factors such as rainfall, air, water, temperature, nutrient concentration and salinity of water. Zooplankton diversity and density also depends on the inter-specific predation by invertebrates.

Pouring evidence suggests that the Rotifers population density depends upon the availability of food and temperature.

Growth of Zooplanktons was maximum in summer and minimum in winter, the reason may be fluctuations in light intensity and temperature in turn affecting the food supply of Zooplankton.
### Table: Distribution Pattern of Zooplanktons in 4 Waterbodies of Alnawar (2012-14) Rotifers

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Zooplankton</th>
<th>Aravatagi</th>
<th>Madikoppa</th>
<th>Dori</th>
<th>Benachi</th>
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<td>Dori</td>
<td>Benachi</td>
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<td>Alona camboueui</td>
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| Total  | 12 | 07 | 09 | 15 |
### Copepoda

<table>
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<tr>
<th>Sl.No.</th>
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<th>Aravatagi</th>
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<th>Dori</th>
<th>Benachi</th>
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<tbody>
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<td>Mesocyclops leuckarti</td>
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<td>Mesocyclops hyalinus</td>
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<td>Paracyclops fimbriatus</td>
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</table>

In present study a total of 63 zooplankton species were identified. Among 63 species, 33 species belongs to Rotifer, 19 species belongs to Cladocera, 7 species belongs to Copepoda and 4 species belongs to Ostracoda.
Systematic Account of Zooplankton

**Cladocers:**

**Family:** sididae.
1. Diaphanosoma excisum.
2. D. sarsi.

**Family:** Daphnidae.
1. Daphnia carinata.
2. Ceriodaphnia comuta.

**Family:** Moinidae.
1. Moina brachiata.
2. M. macrocopia.
3. M. rectirostris.
4. M. micrura.

**Family:** Bosminidae.
1. Bosminopsis deitersi.

**Family:** Macrothricidae.
1. Macrothrix goeldi

**Family:** Chydoridae.
1. Alona monocantha momcantha.
2. A. cambouei.
3. A. pulchella.
5. Pleuroxus trigonellus.
6. P. denticulatus.
7. Chydorus sphaericus.
8. C. barroisi barroisi.
9. C. reticulates.
**Copepods:**

**Family:** Diaptomidae.
1. Rhinediaptomus indicus.
2. Heliodiaptomus viduus.

Family: Cyclopidae.
1. Tropocyclops prasinus.
2. Paracyclops fimbriatus.
3. Mesocyclops leuckarti.
4. M. hyalinus.

**Rotifers:**

**Family:** Brachionidae.
1. Brachionus angularis.
2. B. bidentata.
3. B. caudatus.
4. B. falcatus.
5. B. calyciflorus.
6. B. forficula.
7. B. quadridentatus.
8. B. rubens.
9. B. plicatilis.
10. B. urceolaris.
11. B. diversicomis.
13. P. putulus.
15. K. cochlearis.
**Family**: Lecanidae.
1. Lecane leontina.
2. L. luna.
3. Monostyla bulla.
4. L. monostyla cornuta

**Family**: Euchlanidae.
1. Euchlanis dilatata.

**Family**: Testudinella
1. Testudinella patina.

**Family**: Asplanchnidae.
1. Asplanchna priodanta.
2. A. brightwelli.

**Family**: Mytilinidae.
1. M. ventralis.

**Family**: Colurellidae.
1. Lepadella rhomboids.
2. L. ovalis

**Family**: Trichoceridae.
1. Trichocera similes.

**Family**: Filinidae.
1. Filinia opoliensis.
2. F. longiseta.

**Family**: Philodinidae.
1. Rotifer tardus.
2. Collidina bidens.
Family: Floscularidae.
1. Lacinularia socialis.

Family: Trochospharidae.
1. Horella brehmi.

Ostracods:

Family: Cyprididae.
1. Hemicypris fossulata.
2. Cypris subglobosa

Family: Ilyocypridae.
1. Ilyocypris gibba.

Family: Stenocyprinae.
1. Stenocypris hislopi.
### ROTIFERS

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<tr>
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<tr>
<td>Brachionus calyciflorus</td>
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<td>Brachionus caudatus</td>
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<td>Brachionus falcatus</td>
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<tr>
<td>Brachionus plicatilis</td>
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<td>Brachionus forficula</td>
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<td>Brachionus quadridentatus</td>
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<td>Brachionus rubens</td>
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<td>Image</td>
<td>Species</td>
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<tr>
<td><img src="image_url_1" alt="Image" /></td>
<td><em>Brachionus urceolaris</em></td>
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<tr>
<td><img src="image_url_2" alt="Image" /></td>
<td><em>Brachionus diversicornis</em></td>
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<td><img src="image_url_3" alt="Image" /></td>
<td><em>Keratella tropica</em></td>
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<td><img src="image_url_4" alt="Image" /></td>
<td><em>Keratella cochleris</em></td>
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<tr>
<td><img src="image_url_5" alt="Image" /></td>
<td><em>Platyias patulus</em></td>
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<td><img src="image_url_6" alt="Image" /></td>
<td><em>Platyias quadricornis</em></td>
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<td><img src="image_url_7" alt="Image" /></td>
<td><em>Euchlanis dilatata</em></td>
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<td><img src="image_url_8" alt="Image" /></td>
<td><em>Mytilina ventralis</em></td>
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<td><img src="image_url_9" alt="Image" /></td>
<td><em>Lepadella ovalis</em></td>
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<td>Species</td>
<td>Magnification</td>
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<tr>
<td><em>Lepadella rhomboides</em></td>
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<td><em>Lecane leontina</em></td>
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<tr>
<td><em>Lecane luna</em></td>
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<tr>
<td><em>Lecane cornuta</em></td>
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<tr>
<td><em>Lecane (monostyla) bulla</em></td>
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<tr>
<td><em>Trichocera similis</em></td>
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<td><em>Filinia opoliensis</em></td>
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<td><em>Filinia longiseta</em></td>
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<tr>
<td><em>Testudinella patina</em></td>
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<td>Image 1</td>
<td>Image 2</td>
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<tr>
<td>Asplanchna priodonta (100x)</td>
<td>Horaella brehmi (200x)</td>
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<tr>
<td>Image 4</td>
<td>Image 5</td>
</tr>
<tr>
<td>Rotifer tardus (160x)</td>
<td>Callidina bidens (40x)</td>
</tr>
<tr>
<td>Image 7</td>
<td>Image 8</td>
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<tr>
<td>Brachionus angularis (200x)</td>
<td>Lecane cornuta (100x)</td>
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<td>CLADOCERA</td>
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<td>![Diaphanosoma excisum (100x)]</td>
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<tr>
<td>![Diaphanosoma sarsi (100x)]</td>
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<td>![Diaphanosoma carinata (40x)]</td>
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<td>![Ceriodaphnia cornuta (100x)]</td>
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<td>![Moina macrocopa (40x)]</td>
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<td>![Moina rectirostris (40x)]</td>
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<tr>
<td>![Moina micrura (40x)]</td>
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<tr>
<td>![Bosminopsis deitersi (200x)]</td>
<td></td>
</tr>
<tr>
<td>![Moina brachiata (64x)]</td>
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- **Macrothrix goeldi** (64X)
- **Chydorus sphaericus** (100x)
- **Chydorus reticulatus** (100x)
- **Alona monocantha monocantha** (200x)
- **Alona pulchella** (160x)
- **Alona cambouei** (160x)
- **Biapertura karua** (100x)
- **Pleuroxus trigonellus** (100x)
- **Pleuroxus denticulatus** (100x)
<table>
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<tr>
<th><strong>Species</strong></th>
<th><strong>Magnification</strong></th>
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<tr>
<td>Chydorus barroisi barroisi</td>
<td>(160x)</td>
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<tr>
<td>Diaphanosoma carinata</td>
<td>(40x)</td>
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</tr>
<tr>
<td>Diaphanosoma sarsi</td>
<td>(100x)</td>
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</table>
COPEPODA

Rhinediaptomus indicus (40x)
Heliodiaptomus viduus (40x)
Neodiatomus strigilipes (40x)
Mesocyclops leuckarti (40x)
Mesocyclops hyalinus (100x)
Paracyclops filbriatus (64x)
Tropocyclops prasinus (64x)
Heliodiaptomus viduus (40x)
Mesocyclops leuckarti (40x)
OSTRACODA

Cypris subglobosa (100 x)

Ilyocypris gibba (100 x)

Hemicypris fossylata (100 x)

Stenocypris hislopi (100 x)