CHAPTER - IV

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4.5 Testing Hypotheses

Data Analysis and Interpretation
CHAPTER – IV

DATA ANALYSIS AND INTERPRETATION

4.1. INTRODUCTION

Data analysis is essential for a scientific study and for ensuring that the research has all relevant information for making relevant comparisons and to draw inferences. The collected data through primary method is classified, tabulated and analysed and interpreted.

This chapter presents an economic review of the impact of the inorganic farming practices in the study area. An effort has been made to find out the danger of inorganic farming and safe by organic farming. The primary data has been collected from 200 inorganic farmers and 200 organic farmers, and the total number of farmers chosen for the study is 400. Overall view of the farmers are consolidated and interpreted.

4.2. SOCIO ECONOMIC PROFILE

This chapter explains the socio economic profile of the organic and inorganic farmers.
4.2.1. Farmers Age Composition (in Years)

The following table furnishes the particulars about age composition of
the farmers in the study area.

**TABLE - 4.1**

FARMERS AGE COMPOSITION (IN YEARS)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Age (in years)</th>
<th>Organic farmers</th>
<th>Inorganic farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 – 20</td>
<td>2 (1%)</td>
<td>4(2%)</td>
<td>6(2%)</td>
</tr>
<tr>
<td>2</td>
<td>21 – 40</td>
<td>6(3%)</td>
<td>15(8%)</td>
<td>21(5%)</td>
</tr>
<tr>
<td>3</td>
<td>41 – 60</td>
<td>75(38%)</td>
<td>76(38%)</td>
<td>151(38%)</td>
</tr>
<tr>
<td>4</td>
<td>Above 60</td>
<td>117(59%)</td>
<td>105(53%)</td>
<td>222(55%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>200 (100%)</strong></td>
<td><strong>200 (100%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The table 4.1 shows that 55 percent of the farmers are under the age
group of above 60 years, 38 percent of the farmers are under the age group of
41 – 60 years, and 5 percent of the farmers are under the age group of 21 - 40
years and only 2 percent of the farmers are under the age group of 1-20 years.

On the basis of age, Aged farmers are not interested to follow inorganic
farming practices. Because they are experienced in farming and know about the
defects and drawbacks of inorganic farming. There is no significant difference
between organic farmers and inorganic farmers in their age composition.
CHART - 4.1

AGE COMPOSITION (IN YEARS)

- Organic farmers
- Inorganic farmers
4.2.2. Cultivation of Land on the Basis of Sex

The cultivation of land is done by the males and females in this study area. The following table shows that the farmers contracted by the researcher in 1:1 ratio.

### TABLE - 4.2

CULTIVATION OF LAND ON THE BASIS OF SEX

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Sex</th>
<th>Organic farmers</th>
<th>Inorganic farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Male</td>
<td>108 (54%)</td>
<td>98 (49%)</td>
<td>206 (51%)</td>
</tr>
<tr>
<td>2</td>
<td>Female</td>
<td>92 (46%)</td>
<td>102 (51%)</td>
<td>194 (49%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>200 (100%)</td>
<td>200 (100%)</td>
<td>400 (100%)</td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The table 4.2 indicates that farm operations are carried out by the men and women. The table shows 51 percent male farmers and 49 percent female farmers are taken into account for this study. The usage of organic and inorganic farming practices are not based on the gender forms. Both male and female are actively involving in agriculture.
CHART - 4.2

CULTIVATION OF LAND ON THE BASIS OF SEX

- Organic Farmers
  - Male: 108
  - Female: 92

- Inorganic Farmers
  - Male: 98
  - Female: 102

Legend:
- Orange: Male
- Green: Female
4.2.3. Members of Family

The following table shows the family members of the organic and inorganic farmers in the study area.

**TABLE - 4.3**

**MEMBERS OF FAMILY**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Members</th>
<th>Organic farmers</th>
<th>Inorganic farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 – 3</td>
<td>10(5%)</td>
<td>5(3%)</td>
<td>15(4%)</td>
</tr>
<tr>
<td>2</td>
<td>4 – 7</td>
<td>120(60%)</td>
<td>95(47%)</td>
<td>215(54%)</td>
</tr>
<tr>
<td>3</td>
<td>8 – 11</td>
<td>65(32%)</td>
<td>40(20%)</td>
<td>105(26%)</td>
</tr>
<tr>
<td>4</td>
<td>Above 11</td>
<td>5(3%)</td>
<td>60(30%)</td>
<td>65(16%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200 (100%)</strong></td>
<td><strong>200 (100%)</strong></td>
<td></td>
<td><strong>400 (100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The above table 4.3 clarifies that 54 percent of the farmers are having 4-7 members in the family and 26 percent of the farmers are having 8 – 11 members in the family and 16 percent of the farmers are having above 11 members in the family. Only 4 percent of the farmers are following the family planning norms in this study region. Agriculture is carried out in India largely with the help of family members. The trend is changing with a large proportion of farm workers are hired labourers.
CHART - 4.3

MEMBERS OF FAMILY

- 32% (1-3)
- 3% (4-7)
- 5% (8-11)
- 60% (Above 11)
4.2.4. Educational Status

The following table shows that the educational status of the organic and inorganic farmers. Tamilnadu is one of the most educated states of India with overall of 67.5 percentages (2011 Census). The same trend of literacy is found in the study area.

**TABLE - 4.4**

**EDUCATIONAL STATUS**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Education</th>
<th>Organic farmers</th>
<th>Inorganic farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 – 5</td>
<td>10(5%)</td>
<td>80(40%)</td>
<td>90(23%)</td>
</tr>
<tr>
<td>2</td>
<td>6 – 10</td>
<td>53(27%)</td>
<td>30(15%)</td>
<td>83(21%)</td>
</tr>
<tr>
<td>3</td>
<td>11 – 12</td>
<td>64(32%)</td>
<td>12(6%)</td>
<td>76(19%)</td>
</tr>
<tr>
<td>4</td>
<td>UG</td>
<td>13(7%)</td>
<td>8(4%)</td>
<td>21(5%)</td>
</tr>
<tr>
<td>5</td>
<td>PG</td>
<td>10(5%)</td>
<td>3(2%)</td>
<td>13(3%)</td>
</tr>
<tr>
<td>6</td>
<td>Uneducated</td>
<td>50(25%)</td>
<td>67(33%)</td>
<td>117(29%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>200 (100%)</strong></td>
<td><strong>200 (100%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The table 4.4 explains that 75 percent of the organic farmers and 67 percent of the inorganic farmers are educated; overall 29 percent of the farmers are uneducated. Only 40 percent of the inorganic farmers are completed their
education in 1-5th standard level and 4 percent of them graduates but 32 percent of the organic farmers are completed their education in higher secondary level and 7 percent of them graduates in this study area. In order to find out, educated farmers have awareness about the nature of soil, testing of soil, market value of the products, safety measurement of health, and implementation of new scientific techniques. But uneducated farmers are not having such awareness. Chart 4.4 pointed out those organic farmers’ educated more than inorganic farmers.
CHART - 4.4

EDUCATIONAL STATUS

Educated | Uneducated

Organic farmers: 150 Educated, 50 Uneducated
Inorganic farmers: 133 Educated, 67 Uneducated
4.2.5. Experience in Farming

In recent years agriculture is attracted by the younger generation. The old and experienced people in farming have the passion for farming. The following table shows the experiences of the farmers in the farming in the study area.

**TABLE - 4.5**

EXPERIENCE IN FARMING

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Experience (in years)</th>
<th>Organic farmers</th>
<th>Inorganic farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1 – 5</td>
<td>80 (40%)</td>
<td>65 (33%)</td>
<td>145 (36%)</td>
</tr>
<tr>
<td>2</td>
<td>6 – 10</td>
<td>20 (10%)</td>
<td>35 (17%)</td>
<td>55 (14%)</td>
</tr>
<tr>
<td>3</td>
<td>11 – 15</td>
<td>50 (25%)</td>
<td>40 (20%)</td>
<td>90 (23%)</td>
</tr>
<tr>
<td>4</td>
<td>Above 15</td>
<td>50 (25%)</td>
<td>60 (30%)</td>
<td>110 (27%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>200 (100%)</strong></td>
<td><strong>200 (100%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The table 4.5 elucidates that 36 percent of the farmers are experienced with 1 – 5 years; and 27 percent of the farmers are experienced above 15 years; and 23 percent of the farmers are 10-15 years; and 14 percent of the farmers are 5-10 years and 64 percent of the farmers are experienced above 5 years in this study area. Farmers know that the organic farming is beneficial to the environment by their own experience had shown in the Chart 4.5.
CHART - 4.5

EXPERIENCE IN FARMING

- 1-5: 25%
- 6-10: 25%
- 11-15: 25%
- Above 15: 25%

- 10%
4.2.6. Annual Income (in Rupees)

The following table summarises the annual income the organic and inorganic farmers.

**TABLE - 4.6**

**ANNUAL INCOME (IN RUPEES)**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Annual Income (in Rupees)</th>
<th>Organic farmers</th>
<th>Inorganic farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><code>10,000 to </code>1,00,000</td>
<td>66 (33%)</td>
<td>32 (16%)</td>
<td>98 (25%)</td>
</tr>
<tr>
<td>2</td>
<td><code>00,001 to </code>5,00,000</td>
<td>40 (20%)</td>
<td>60 (30%)</td>
<td>100(25%)</td>
</tr>
<tr>
<td>3</td>
<td><code>5,00,001 to </code>10,00,000</td>
<td>58 (29%)</td>
<td>45 (23%)</td>
<td>103(26%)</td>
</tr>
<tr>
<td>4</td>
<td><code>10,00,001 to </code>15,00,000</td>
<td>23 (12%)</td>
<td>38 (19%)</td>
<td>61 (15%)</td>
</tr>
<tr>
<td>5</td>
<td>Above `15,00,000</td>
<td>13 (6%)</td>
<td>25 (12%)</td>
<td>38 (9%)</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>200 (100%)</strong></td>
<td><strong>200 (100%)</strong></td>
<td><strong>400(100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The table 4.6 shows that 50 percent of the farmers annual income is in the range of `10,000 to `5,00,000, and 26 percent of the farmers annual income is in the range of `10,00,001 to `15,00,000, and 9 percent of the farmers have annual income above `15,00,000. Inorganic farmers’ annual income is 10 percent excess than organic farmers and the causes of the economic cost of inorganic fertilizer, pesticides and herbicides are low and the labour cost during the application also low and it is shown in Chart 4.6.
CHART - 4.6

ANNUAL INCOME (IN RUPEES)

- Organic farmers
  - 10,000 TO 100,000: 66
  - 500,001 TO 10,00,000: 40
  - 100,001 TO 500,000: 25
  - 10,00,001 TO 15,00,000: 23

- Inorganic farmers
  - 10,000 TO 100,000: 30
  - 500,001 TO 10,00,000: 35
  - 100,001 TO 500,000: 25
  - 10,00,001 TO 15,00,000: 25
4.2.7. Livestock Species in Farm

The following table gives the details of livestock species in farm compare to organic farmers with inorganic farmers.

**TABLE - 4.7**  
**LIVESTOCK SPECIES IN FARM**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Livestock species</th>
<th>Have</th>
<th>Haven't</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>178 (89%)</td>
<td>22 (11%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>165 (83%)</td>
<td>35 (17%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>343 (86%)</strong></td>
<td><strong>57 (14%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The table 4.7 shows that 86 percent of the farmers are having Livestock species such as cow, bull, buffalo, goat, sheep, rabbit and chicken. Organic farmers having (6 percent) more Livestock species compared to than inorganic farmers. Because organic farmers are using manure or natural organic fertilizer or organic pesticides only in their field; but inorganic farmers are using manure with inorganic chemicals. Chart 4.7 exhibits Organic farmers had more Livestock species compared to inorganic farmers in this study area.
CHART - 4.7

LIVE STOCK SPECIES IN FARM

Organic farmers

Inorganic farmers

Have

Haven't

Have

Haven't
4.3. DETAILS OF FARMING

This chapter gives the details of farming in the study region.

4.3.1. Types of Farm

The following table presents the type of farm holding by the organic and inorganic farmers in the study area.

| TABLE - 4.8 |
| TYPES OF FARM |

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Farm (in acres)</th>
<th>Organic farmers</th>
<th>Inorganic farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Own farm</td>
<td>Lease farm</td>
<td>Own farm</td>
</tr>
<tr>
<td>1</td>
<td>1 – 10</td>
<td>135(68%)</td>
<td>30(15%)</td>
<td>40(20%)</td>
</tr>
<tr>
<td>2</td>
<td>Above 10</td>
<td>18(9%)</td>
<td>17(8%)</td>
<td>50(25%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>153(77%)</td>
<td>47(23%)</td>
<td>90(45%)</td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The above table 4.8 confirms that 76 percent of the farmers having farm of 1 - 10 acres and 24 percent of the farmers having farm of above 10 acres. In addition to 77 percent of the organic farmers have own farm but 55 percent of the inorganic farmers have only lease hold farm.
CHART - 4.8

TYPES OF FARM

- Inorganic Farmers Lease Farm 33%
- Inorganic Farmers Own Farm 13%
- Organic Farmers Lease Farm 10%
- Organic Farmers Own Farm 44%
4.3.2. Types of Soil

The study area is holding by alluvial and red soil. The following table shows the distribution of organic and inorganic farmers.

**TABLE - 4.9**

**TYPES OF SOIL**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Type of Soil</th>
<th>Organic farmers</th>
<th>Inorganic farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Alluvial</td>
<td>152 (76%)</td>
<td>140 (70%)</td>
<td>292 (73%)</td>
</tr>
<tr>
<td>2</td>
<td>Red Soil</td>
<td>48 (24%)</td>
<td>60 (30%)</td>
<td>108 (27%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>200 (100%)</strong></td>
<td><strong>200 (100%)</strong></td>
<td><strong>400(100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

As shown in the table 4.9, 73 percent of the farmers had Alluvial and 27 percent had red soil. It is found that 76 percent of the organic farmers had alluvial and 24 percent had red soil in this study area. And 70 percent of the inorganic farmers had alluvial and 30 percent had red soil. Soils found in this area are Alluvial and Red Soil. They are suitable for the cultivation of both food and commercial crops.
CHART - 4.9

TYPES OF SOIL

- Red Soil, 48%
- Red Soil, 60%
- Alluvial, 152%
- Alluvial, 140%

Organic farmers

Inorganic farmers
4.3.3. Soil Test

The following table furnishes how many organic and inorganic farmers tested their soil in the study area.

**TABLE - 4.10**

**SOIL TEST**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Soil Test</th>
<th>Did</th>
<th>Didn't</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>106 (53%)</td>
<td>94 (47%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>20 (10%)</td>
<td>180 (90%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>126 (32%)</td>
<td>274 (68%)</td>
<td>400 (100%)</td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The above table 4.10 shows that organic farmers did soil test in 53 percent. But inorganic farmers didn't test the soil in 90 percent. So, overall 32 percent of the farmers only did soil test in this region. There is significant difference between the organic and inorganic farmers. In addition to 53 percent of organic farmers did soil test because they know about no amount of soil testing and fertilizer application will overcome physical problems related to the plant root system, so they did soil test 43 percent more than inorganic farmers.

Soil test reports are usually in three main parts. First part indicates results of analyses of the soil sample. Most laboratories give actual analyses as
well as the ratings. Second part is fertilizer recommendations for the crop based on soil analyses, history of the field like cropping pattern, manures and fertilizers earlier applied. This part indicates quantities of nitrogen, phosphate, potash, zinc and also of lime or gypsum to be applied per hectare. Most laboratories also show in the report optimum quantities of organic manures as per recommendations of the Agriculture department. Third part of the report usually indicates time and methods of fertilizer application and other practices required to make the fertilizer use more efficient.
SOIL TEST

Organic farmers 84%

Other 16%

Inorganic farmers 16%
4.3.4. Traditional Technologies

The following table exhibits how many organic and inorganic farmers are using traditional technologies in their farm in the study area.

**TABLE - 4.11**

**TRADITIONAL TECHNOLOGIES**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Traditional technologies</th>
<th>Used</th>
<th>Not Used</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>190 (95%)</td>
<td>10 (5%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>80 (40%)</td>
<td>120 (60%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>270 (68%)</td>
<td>130 (32%)</td>
<td>400 (100%)</td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The above table 4.11 shows that 95 percent of the organic farmers are following traditional technologies such as light trap, colour trap, sex paramone trap and fumigation in their field. 40 percent of the inorganic farmers are following such traditional technologies. Overall 68 percent of the farmers using traditional technologies, 32 percent of the farmers didn’t use traditional technologies. There is significant difference between the organic and inorganic farmers. 95 percent of the organic farmers are following traditional technologies such as light trap, colour trap, sex paramone trap and fumigation in their field. But only 40 percent of the inorganic farmers are following such traditional technologies.
4.3.5. Trap Cropping

The following table shows how many organic and inorganic farmers are using trap cropping in their farm in the study area.

**TABLE - 4.12**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Trap cropping</th>
<th>Did</th>
<th>Didn't</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>189(95%)</td>
<td>11(5%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>35(18%)</td>
<td>165(82%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>224 (56%)</strong></td>
<td><strong>176 (44%)</strong></td>
<td><strong>400 (100%)</strong></td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data

The above table 4.12 indicates that 95 percent of the organic farmers are planting of a trap crop to protect the main cash crop from a certain pest. The trap crop can be from the same or different family group, than that of the main crop, as long as it is more attractive to the pest. It preserves the indigenous natural enemies, improves the crop's quality and helps conserve the soil and the environment. But 82 percent of the inorganic farmers follow the monocrops in their field. Many diseases and pests came due to the ecological imbalance that was created by the introduction of monocrops which was quite different from the multi-cropping farming done in the past. There was also the danger that in monocrops systems, continuous and irrational use of chemicals could lead to resistance building in the pests. Only 56 percent of the farmers following trap cropping. It preserves the indigenous natural enemies, improves the crop's quality and helps conserve the soil and the environment.
**CHART - 4.12**

**TRAP CROPPING**

![Graph showing trap cropping comparison between organic and inorganic farmers. The graph indicates a significant difference in crop yield between the two groups.](image-url)
4.3.6. Cannals Irrigation

The following table illustrates cannals irrigation of organic and inorganic farmers in the study area.

**TABLE - 4.13**

**CANNALS IRRIGATION**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Irrigation</th>
<th>Organic farmers</th>
<th>Inorganic farmers</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Well</td>
<td>182(91%)</td>
<td>95(48%)</td>
<td>277(69%)</td>
</tr>
<tr>
<td>2</td>
<td>River</td>
<td>12(6%)</td>
<td>64(32%)</td>
<td>76(19%)</td>
</tr>
<tr>
<td>3</td>
<td>Lake</td>
<td>6(3%)</td>
<td>26(13%)</td>
<td>32(8%)</td>
</tr>
<tr>
<td>4</td>
<td>Dam</td>
<td>0(0%)</td>
<td>15(7%)</td>
<td>15(4%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>200 (100%)</strong></td>
<td><strong>200 (100%)</strong></td>
<td></td>
<td><strong>400 (100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The above table 4.13 expounds that 91 percent of the organic farmers and 48 percent of the inorganic farmers are using wells for irrigation; 19 percent of the farmers are using river; and 8 percent of the farmers are using lake and 4 percent of the farmer is using dam. No organic farmers are using dam for irrigation and they are mostly depending on well irrigation only. Well irrigation has been followed by the 277 farmers (69 percent) farmers in this study area.
CHART - 4.13

CANNALS IRRIGATION

- Organic farmers
- Inorganic farmers
4.3.7. Crop Rotation

The following table mentions crop rotation used by the organic and inorganic farmers in the study area.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Cropping pattern</th>
<th>Used</th>
<th>Not Used</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>128(64%)</td>
<td>72(36%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>53(27%)</td>
<td>147(73%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>181(45%)</strong></td>
<td><strong>219(55%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The above table 4.14 concludes that 64 percent of the organic farmers are using cropping rotation in their field. But 73 percent of the inorganic farmers are not using Cropping rotation in their field. Organic farmers have been Cropping pattern than inorganic farmers in this study area. Crop rotation is the practice of growing a series of dissimilar types of crops in the same area in sequential seasons.

Crop rotation confers various benefits to the soil. A traditional element of crop rotation is the replenishment of nitrogen through the use of green manure in sequence with cereals and other crops. Crop rotation also mitigates
the build-up of pathogens and pests that often occurs when one species is continuously cropped, and can also improve soil structure and fertility by alternating deep-rooted and shallow-rooted plants.

Using crop rotation farmers can keep their fields under continuous production, instead of letting them lay fallow, as well as reducing the need for artificial fertilizers, both of which can be expensive.

A general effect of crop rotation is that there is a geographic mixing of crops, which can slow the spread of pests and diseases during the growing season. The different crops can also reduce the effects of adverse weather for the individual farmer and, by requiring planting and harvest at different times; allow more land to be farmed with the same amount of machinery and labor.

Crop rotation is also used to control pests and diseases that can become established in the soil over time. The changing of crops in a sequence tends to decrease the population level of pests. Rotating crops adds nutrients to the soil. Crop rotation can greatly affect the amount of soil lost from erosion by water.
CHART - 4.14

CROP ROTATION

Organic farmers

Inorganic farmers

Used

Not Used

147

128

72

54

Used

Not Used
4.4. COMPARISON BETWEEN INORGANIC AND ORGANIC FARMING

This chapter focuses the difference and similarities between inorganic and organic farming practices in the study region.

4.4.1. Impact of Farming on Yield

The following table provides the production in farming in the study area.

**TABLE - 4.15**

**IMPACT OF FARMING ON YIELD**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Impact of farming on yield</th>
<th>Organic Farming</th>
<th>Inorganic Farming</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>12(6%)</td>
<td>188(94%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>20(10%)</td>
<td>180(90%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>32(8%)</strong></td>
<td><strong>368(92%)</strong></td>
<td><strong>400(100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The above table 4.15 observes that 94 percent of the organic and 90 percent inorganic farmers are accepted that inorganic farming gives higher production compared to organic is farming. Organic farmers told that quantity production will increase in future, if farmers take proper steps and doses. Inorganic farming has led to more production compare to organic farming.
CHART - 4.15

IMPACT OF FARMING ON YIELD

Organic farming

Inorganic farming
4.4.2. Quality of Yield in Farming

The following table provides the quality of yield produced in farming in the study area.

**TABLE - 4.16**

**QUALITY OF YIELD IN FARMING**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Quality of yield in farming</th>
<th>Organic Farming</th>
<th>Inorganic Farming</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>190 (95%)</td>
<td>10 (5%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>189 (95%)</td>
<td>11 (5%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>379 (95%)</strong></td>
<td><strong>21 (5%)</strong></td>
<td><strong>400(100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The above table 4.16 examines that 95 percent of the organic and inorganic farmers are agreed that organic farming gives higher quality yield compare to inorganic farming. Quality production is done by organic farming. Organic farming gives quality yield in terms of taste and nutrients. The health conscious people can consume organic food items. The organic food items will enhance the health status of the people.
CHART - 4.16

QUALITY OF YIELD IN FARMING

Organic farmers

Inorganic farmers

Organic farming

Inorganic farming
4.4.3. Expensive Farming

The following table gives the opinion of the organic and inorganic farmers about which is the expensive farming in the study area.

**TABLE - 4.17**

**EXPENSIVE FARMING**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Expensive farming</th>
<th>Organic Farming</th>
<th>Inorganic Farming</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic Farmers</td>
<td>17 (9%)</td>
<td>183 (91%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic Farmers</td>
<td>20 (10%)</td>
<td>180 (90%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>37 (9%)</strong></td>
<td><strong>363 (91%)</strong></td>
<td><strong>400(100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The above table 4.17 shows that 91 percent of the farmers thought organic farming is expensive compare to inorganic farming. In the opinion of the organic farmers 91 percent observed that inorganic farming is expensive farming. And 90 percent of the inorganic farmers accepted that inorganic farming is expensive farming. So, organic farming is costly due to lack of labourers and costly inputs.
CHART - 4.17

EXPENSIVE FARMING

Organic farmers  Inorganic farmers

Organic farming  Inorganic farming
4.4.4. Pest Attack in Farming

The following table explains pest attacks more in which farming in the estimation of the organic and inorganic farmers in the study area.

**TABLE - 4.18**

PEST ATTACK IN FARMING

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Pest Attack in farming</th>
<th>Organic farming</th>
<th>Inorganic Farming</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>34 (17%)</td>
<td>166 (83%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>30 (15%)</td>
<td>170 (85%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>64 (16%)</strong></td>
<td><strong>336 (84%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

From the above table it is inferred that both organic 83 percent and inorganic farmers 85 percent accepted that pest attack is more in inorganic farming. The pest attack is relatively low in organic farming and this fact is endorsed by 17 percent of organic and 15 percent of inorganic farmers. The views are presented in the bar diagram (Chart 4.18).
CHART - 4.18

PEST ATTACK IN FARMING

Organic farmers

Inorganic farmers

Organic farming

Inorganic farming
4.4.5. Loss Due to Pest in Farming

The following table shows loss due to pest in which farming in the view of the organic and inorganic farmers in the study area.

**TABLE - 4.19**

**LOSS DUE TO PEST IN FARMING**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Loss due to pest in farming</th>
<th>Organic farming</th>
<th>Inorganic Farming</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>12 (6%)</td>
<td>188 (94%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>17 (9%)</td>
<td>183 (91%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>29 (8%)</strong></td>
<td><strong>371 (92%)</strong></td>
<td><strong>400(100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The above table 4.19 shows that 94 percent of the organic farmers and 91 percent of the inorganic farmers agreed that loss is due to pest attack in inorganic farming. It is also observed that 6 percent of the organic farmers and 9 percent of the inorganic farmers agreed that loss due to pest attack in organic farming.

It is found that 92 percent loss is due to pest occurs attack in inorganic farming. Not much loss is due to pest attack in organic farming compared to inorganic farming. So, pest free farming is organic farming only. Not much loss due to pest in organic farming. So, pest free farming is organic farming only.
CHART - 4.19

LOSS DUE TO PEST IN FARMING

- Inorganic farmers: 17
  - Inorganic farmers: 183

- Organic farmers: 12
  - Organic farmers: 188

Organic farming  Inorganic farming
4.4.6. Profit in Farming

The following table elucidates which is profit farming in the outlook of the organic and inorganic farmers in the study area.

**TABLE 4.20**

**PROFIT IN FARMING**

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Profit in farming</th>
<th>Organic farming</th>
<th>Inorganic Farming</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>30 (15%)</td>
<td>170 (85%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>18 (9%)</td>
<td>182 (91%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td><strong>48 (12%)</strong></td>
<td><strong>352 (88%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

The above table 4.20 elucidates that 85 percent of the organic farmers and 91 percent of the inorganic farmers are accepted that inorganic farming earns more profit than organic farming. In addition to 15 percent of the organic farmers and 9 percent of the inorganic farmers are accepted that inorganic farming not earns more profit than organic farming. Inorganic farming earns more profit than organic farming. For the practice or trial of organic farming the farmers need more money and land, if it fulfills the farming needs, organic farming will produce more profit than inorganic farming.
4.5. TESTING HYPOTHESES

This chapter portrays the results of hypothesis.

4.5.1. Research Hypothesis - I

The first hypothesis which states that the health of the Humans, Domestic animals, birds and beneficial insects are adversely affected by pesticides and herbicides used by the farmers in the study area.

Chi-square test is used to find out the adverse impact of fertilizers and pesticides on

- human health,
- health disorder,
- long term diseases and
- livestock health.

The first hypothesis is tested on the basis of above four heads.
### TABLE – 4.21

**EFFECT OF INORGANIC FARMING PRACTICES ON HUMAN BEING**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Effect of Inorganic farming practices on Human being</th>
<th>Fertilizer</th>
<th>Pesticides</th>
<th>Herbicides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>188 (94%)</td>
<td>12 (6%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>180 (90%)</td>
<td>20 (10%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>368 (92%)</strong></td>
<td><strong>32 (8%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
<tr>
<td></td>
<td>Calculated $\chi^2 = \sum[(O-E)^2/E]$</td>
<td>2.173913</td>
<td>3.01029</td>
<td>3.184023</td>
</tr>
</tbody>
</table>

**Source:** Compiled from Primary Data  
**Sample Size:** 400  
**Table value of $\chi^2_{0.05}=3.84$**
As seen from the above table 4.21 that 92 percent farmers are affected by itching, irritation, swelling, breathing problems use of handling of fertilizer, it showed in the Figure 2 and only 8 percent of the farmers following precaution steps. And also 96 percent of the farmers felt the following symptoms such as eye irritation, cough, fever, cold, giddiness and head-ache by use of handling of pesticides and 4 percent of the farmers not felt the above symptoms. In addition to 84 percent of the farmers felt vomiting, irritation and itching by use of handling herbicides and 16 percent of the farmers not affected.

Who are practicing inorganic farming feel the following long term diseases symptoms such as itching, irritation, swelling, breathing problems, eye irritation, cough, fever, cold and head-ache, vomiting and giddiness. So, inorganic farmers should follow the precaution steps before using pesticides, fertilizers and herbicides. Inorganic chemicals can be dangerous to humans as well. Inorganic man-made fertilizers, then again, should go with labels warning against overdose. Excessive nitrates from fertilizers are linked to a variety of cancers due to the nitrates remaining at high levels in the foods, and not just causing cancers in those living near the contaminated local soils and streams.

Highly poisonous Pesticides and Herbicides chemical remains found in foods. The child’s future health is now determined by food choices. If pesticides and herbicides present in the food may cause cancer, nervous system disorder, heart problems, birth defects, infertility, blood pressure, kidney
trouble, itching, irritation, swelling, breathing problems, eye irritation, cough, fever, cold and head-ache, vomiting, giddiness and etc. Inorganic farming gives health disorders to human, animals and birds than organic farming.

Illiterate farm workers didn’t know the regulations and seriousness of inorganic farming. So they use chemical fertilizers, pesticides and herbicides as overdose in their farming. That is why, sudden death is happening in the farmers community. Aged farmers are not interested to follow inorganic farming practices. Because they are experienced in farming and knows about the defects and drawbacks of inorganic farming.

According to the Agency for Toxic Substances and Disease Registry, the chemicals used in the making of commercial fertilizers create high concentrations of nitrate compounds within the soil. Nitrates are naturally occurring ions that form when organic nitrogen materials decompose in the soil. Nitrate ions act as chemically charged molecules that offset the natural balance within a soil environment. Nitrates can have the same effects on the human body as well as in plant and animal bodies, according to Pest Management at the Crossroads. Over time, nitrates can accumulate inside the body and eventually disrupt normal functions within the body's endocrine, neurological and immune systems. Nitrates pose a particularly dangerous threat to fetal development and infant health in terms of brain and immune system development.
From the Chi-square test table 4.21, the significant value of fertilizer is 2.173913, Pesticides is 3.01029 and herbicides is 3.184023 which is less than the table value 3.84; which shows that there is no significant variation between organic and inorganic farmers opinions about inorganic farming affects human being. **Hence the first hypothesis which states that the health of the humans are adversely affected by pesticides and herbicides used by the farmers in the study area is proved correct.**
CHART - 4.21

EFFECT OF INORGANIC FARMING PRACTICES ON HUMAN BEING

- Fertilizer
- Pesticides
- Herbicides

Organic farmer
Inorganic farmer
TABLE - 4.22

HEALTH DISORDERS IN FARMING

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Health disorders in farming</th>
<th>Organic farming</th>
<th>Inorganic Farming</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>40 (20%)</td>
<td>160 (80%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>40 (20%)</td>
<td>160 (80%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>80(20%)</td>
<td>320 (80%)</td>
<td>400(100%)</td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data

Calculated Value of $\chi^2$ test = 0.00 Table value of $\chi^2_{0.05}=3.84$

The above table 4.22 shows that 80 percent of the organic and inorganic farmers are accepted the most of the health disorders (source) comes from only by inorganic farming only. And also 20 percent of the farmers accepted that the least of the health disorders may comes from organic farming.

The calculated value of $\chi^2$ is 0.00 which is less than the table value of 3.84. There is no significant difference between views about humans is affected by the use of inorganic farming. Inorganic farming gives health disorders to human, animals and birds than organic farming. **Hence the first hypothesis which states that the health of the humans are adversely affected by pesticides and herbicides used by the farmers in the study area is proved correct.**
CHART - 4.22

HEALTH DISORDERS IN FARMING

Inorganic Farming

Organic Farming

0 50 100 150 200 250 300 350

Organic farmers  inorganic farmers
TABLE - 4.23
LONG TERM DISEASE

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Long term diseases</th>
<th>Have</th>
<th>Haven't</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>135(68%)</td>
<td>65(32%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>150(75%)</td>
<td>50(25%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>285 (71%)</td>
<td>115 (29%)</td>
<td></td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data

Calculated Value of $\chi^2$ test = 2.745995  Table value of $\chi^2_{0.05}$=3.84

The above table 4.22 inculcates that 68 percent of the organic farmers and 75 percent of the inorganic farmers are having long term disease like asthma, diabetes, epilepsy, infertility, cataract, cancer, nervous problem and heart diseases. So, 32 percent of the organic farmers and 25 percent of the inorganic farmers are not having such long term diseases.

In addition to 71 percent of the farmers are having long term diseases like Asthma, diabetes, epilepsy, infertility, cataract, cancer, nervous problem and heart diseases. Organic farmers told that the most of the farmers dead without knowing about the affected disease by the practice of inorganic chemicals are used in their field. So, inorganic farmers are affected by inorganic fertilizer 7 percent excess than organic farmers.

The calculated value of $\chi^2$ is 2.745995 which is less than the table value of 3.84. There is no significant difference between visions about humans is affected by the practice of inorganic farming. Hence, the first hypothesis which states that the health of the Humans are adversely affected by pesticides and herbicides used by the farmers in the study area is proved correct.
CHART - 4.23

LONG TERM DISEASES

Inorganic farmers

150

50

Organic farmers

135

65

Have  Haven't
TABLE – 4.24

EFFECT OF INORGANIC FARMING PRACTICES ON DOMESTIC ANIMALS

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Effect of Inorganic farming practices on domestic animals</th>
<th>Fertilizer</th>
<th>Pesticides</th>
<th>Herbicides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>21 (11%)</td>
<td>179 (89%)</td>
<td>200</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>14 (7%)</td>
<td>186 (93%)</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>35 (9%)</td>
<td>365 (91%)</td>
<td>400</td>
</tr>
</tbody>
</table>

Calculated $\chi^2 = \sum [(O-E)^2/E] = 1.534247 + 2.572606 + 3.698865 = 3.698865$

Source: Compiled from Primary Data  
Sample Size: 400  
Table value of $\chi^2_{0.05} = 3.84$
As shown in the table 4.24, 91 percent of the farmers are accepted that the domestic animals are not affected by using of fertilizer and 9 percent of the domestic animals are not affected by using of fertilizer. In addition to 54 percent of the domestic animals are affected by using of pesticides in the field as well as 58 percent of the domestic animals are affected by using of herbicides, it showed in the Figure 3.

Farmers insisting that domestic animals like cows, buffalos, oxes, coats, sheep, rabbit and squirrel are eating after spreading or spraying of inorganic matters on the field unknowingly. It causes death of domestic animals. Domestic animals subsequently affects by use of herbicides, pesticides and fertilizer.

From the Chi-square tests table 4.24, the significant value of fertilizer is 1.534247, Pesticides is 2.572606 and herbicides is 3.698865 which are less than the table value 3.84; which shows that there is no significant variation between organic and inorganic farmers opinions about inorganic farming affects domestic animals. **Hence the first hypothesis which states that the health of the domestic animals are adversely affected by pesticides and herbicides used by the farmers in the study area is proved correct.**
COW IS AFFECTED BY PESTICIDES AND HERBICIDES

Figure 3
CHART - 4.24

EFFECT OF INORGANIC FARMING PRACTICES ON DOMESTIC ANIMALS

- Fertilizer
  - Affected: 179
  - Not affected: 179
- Pesticides
  - Affected: 99
  - Not affected: 115
- Herbicides
  - Affected: 125
  - Not affected: 94
### TABLE – 4.25

#### EFFECT OF INORGANIC FARMING PRACTICES ON BIRDS

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Effect of Inorganic farming practices on birds</th>
<th>Fertilizer</th>
<th>Pesticides</th>
<th>Herbicides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>9   (5%)</td>
<td>191   (95%)</td>
<td>200</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>3  (2%)</td>
<td>197  (98%)</td>
<td>200</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>12</strong> (3%)</td>
<td><strong>388</strong> (97%)</td>
<td><strong>400</strong></td>
</tr>
</tbody>
</table>

Calculated $\chi^2 = \sum [(O-E)^2/E] = 3.092784$  

**Source:** Compiled from Primary Data  
**Sample Size:** 400  
**Table value of $\chi^2_{0.05}=3.84$**
The table 4.25 represents that 97 percent of the farmers are reporting that birds are not affected by use of fertilizer; 65 percent of farmers are reporting birds are affected by use of pesticides and 89 percent of the farmers agreed birds are not affecting by use of herbicides.

There is no considerable difference between organic farmers and inorganic farmers. Birds such as raven, crow, cuckoo, crane, sparrow, cock, swallow, stork, ostrich, parrot, kite, dove, hen, duck, mynah, turkey, partridge quail and sky lark are largely affected by use of pesticides only not by use of fertilizer and herbicides.

From the Chi-square tests table 4.25, the significant value of fertilizer is 3.092784, Pesticides is 3.537504 and herbicides is 3.288267 which are less than the table value 3.84; which shows that there is no significant variation between organic and inorganic farmers outlooks about inorganic farming effects on birds. **Hence the first hypothesis which states that the health of the birds are adversely affected by pesticides and herbicides used by the farmers in the study area is proved correct.**
CHART - 4.25

EFFECT OF INORGANIC FARMING PRACTICES ON BIRDS

<table>
<thead>
<tr>
<th></th>
<th>Organic farmers</th>
<th>Inorganic farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Herbicides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not affected</td>
<td>174</td>
<td>185</td>
</tr>
<tr>
<td>Affected</td>
<td>26</td>
<td>15</td>
</tr>
<tr>
<td>Pesticides</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not affected</td>
<td>62</td>
<td>80</td>
</tr>
<tr>
<td>Affected</td>
<td>138</td>
<td>120</td>
</tr>
<tr>
<td>Fertilizer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not affected</td>
<td>151</td>
<td>197</td>
</tr>
<tr>
<td>Affected</td>
<td>9</td>
<td>3</td>
</tr>
</tbody>
</table>
TABLE – 4.26

EFFECT OF INORGANIC FARMING PRACTICES ON BENEFICIAL INSECTS

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Effect of Inorganic farming practices on Beneficial insects</th>
<th>Fertilizer</th>
<th>Pesticides</th>
<th>Herbicides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>190 (95%)</td>
<td>10 (5%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>181 (91%)</td>
<td>19 (9%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>371 (93%)</td>
<td>29 (7%)</td>
<td>400 (100%)</td>
</tr>
</tbody>
</table>

Calculated $\chi^2 = \sum [(O-E)^2/E]$ = 3.011432

Source: Compiled from Primary Data

Sample Size: 400

Table value of $\chi^2_{0.05}$ = 3.84
The table 4.26 shows that 93 percent of the farmers are alerting beneficial insects are killed by use of fertilizer, 96 percent of the farmers are alerting beneficial insects are killed by use of pesticides; 98 percent of the farmers are alerting beneficial insects are killed by use of herbicides.

Insects aid in the production of fruits, seeds, vegetables, and flowers, by pollinating the blossoms. Most common fruits are pollinated by insects. Melons, squash, and many other vegetables require insects to carry their pollen before fruits set. Many ornamental plants, both in the greenhouse and out of doors, are pollinated by insects for example, chrysanthemums, iris, orchids, and yucca. Parasitic insects destroy other injurious insects by living on or in their bodies and their eggs. Insects also act as predators, capturing and devouring other insects. Insects destroy various weeds in the same ways that they injure crop plants. Insects improve the physical condition of the soil and promote its fertility by burrowing throughout the surface layer. Also, the dead bodies and droppings of the insects serve as fertilizer. Insects perform a valuable service as scavengers by devouring the bodies of dead animals and plants and by burying carcasses and dung.

Useful insects spider varieties, big eyed bug, wasp varieties, dragonfly, beetle, honey bee, fly and fire fly are removed by the herbicides, pesticides and fertilizer, the pests began to multiply faster and their resistance to the inorganic matters also increased. These chemicals also poisoned the environment and the
food grains, etc. and pesticides killed the pests it also removed the beneficial insects which to some extent preyed on the harmful insects.

Healthy soils support healthy plants. Naturally occurring in the soil, fungi and other beneficial microorganisms work symbiotically with plants, helping them obtain oxygen from the soil. Some synthetic fertilizers disturb this process. When overused, these products deplete the soil over time.

From the Chi-square tests table 4.26, the significant value of fertilizer is 3.011432, Pesticides is 1.731602 and herbicides is 3.692308 which are less than the table value 3.84; It proves that there is no significant variation between organic and inorganic farmers point of view on inorganic farming adverse impact on beneficial insects. **Hence the first hypothesis which states that the health of the beneficial insects are adversely affected by pesticides and herbicides used by the farmers in the study area is proved correct.**
CHART - 4.26

EFFECT OF INORGANIC FARMING PRACTICES ON BENEFICIAL INSECTS

- Affected Fertilizer: 190
  - Not affected: 181
- Affected Pesticides: 195
  - Not affected: 180
- Affected Herbicides: 192
  - Not affected: 193

Organic farmers: Green
Inorganic farmers: Purple
4.4.2. Research Hypothesis - II

The second hypothesis which states that the continuous uses of inorganic farming practices have toxic effects on soil fertility, seed quality, food chain & food web and environment.

Chi-square test is used to find out the adverse impact of fertilizers and pesticides on

- soil,
- seed germination,
- recommended dose,
- food web and food chain, and
- environment.

The second hypothesis is tested on the basis of above five heads.
**TABLE – 4.27**

EFFECT OF INORGANIC FARMING PRACTICES ON SOIL

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Effect of Inorganic farming practices on soil</th>
<th>Fertilizer</th>
<th>Pesticides</th>
<th>Herbicides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>197 (99%)</td>
<td>3 (1%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>191 (96%)</td>
<td>9 (4%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>388 (97%)</td>
<td>12 (3%)</td>
<td>400 (100%)</td>
</tr>
</tbody>
</table>

Calculated $\chi^2 = \sum [(O-E)^2/E] = 3.092784$  
Calculated $\chi^2 = \sum [(O-E)^2/E] = 3.393939$  
Calculated $\chi^2 = \sum [(O-E)^2/E] = 2.707556$

*Source: Compiled from Primary Data  
Sample Size: 400  
Table value of $\chi^2_{0.05} = 3.84$*
The table 4.27 elucidates that 97 percent of the farmers are warning that applying of fertilizer in the field is diminishing the soil quality shows in Figure 4. And 96 percent of the farmers are warning that applying of pesticides in the field is lessening the soil quality shows in Figure 5. In addition to 95 percent of the farmers are warning that applying of herbicides in the field is decreasing the soil quality shows in Figure 6.

Subsequent use of fertilizers, pesticides and herbicides decreases the fertility of soil and contaminate the soil. Many grasses don't adopt easily to the high acidity levels in chemically kept soils. Troubles from chemical mix low-cost chemical fertilizers dissolve rapidly in soil. This generally leads in a speedy explosion of plant growth, followed 5 or 6 weeks later by a large droop, needing yet additional applications. Accumulated soil acidity from chemicals drives earthworms & micro-organisms to migrate from the soil. Use of herbicides is that overly heavy applications can build up toxic concentrations of salts in the soil and create chemical imbalances. The soil with chemicals form the top layer means, the water and root system of the plants can’t penetrate into the deep level. The fertility of soil is decreased.

When the soil is chemically fertilized top soil is washed away and structure is ignored. Soil has different inherent problems because of which soil fertility management differ from one group of soils to others. Nowadays planting the same crop year after year is a fashion. It leads to soil erosion to overcome it every farmer should follow crop rotation.
From the Chi-square tests table 4.27, the significant value of fertilizer is 3.092784, Pesticides is 3.393939 and herbicides is 2.707556 which are less than the table value 3.84; which shows that there is no significant variation between organic and inorganic farmers attitude about subsequent use of fertilizers, pesticides and herbicides on the fertility of soil. **Hence the second hypothesis which states that the continuous uses of inorganic farming practices have toxic effects on soil fertility is proved correct.**

**AFTER APPLICATION OF FERTILIZER IN FARM**

Figure 4
AFTER APPLICATION OF PESTICIDES IN FARM

Figure 5

AFTER APPLICATION OF HERBICIDES IN FARM

Figure 6
CHART - 4.27

EFFECT OF INORGANIC FARMING PRACTICES ON SOIL

Herbicides
- Not affected
- Affected

Pesticides
- Not affected
- Affected

Fertilizer
- Not affected
- Affected

0 50 100 150 200 250 300 350 400

Organic farmers
Inorganic farmers
TABLE - 4.28

SEED CULTIVATION

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Seed Cultivation</th>
<th>Did</th>
<th>Didn't</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>108(54%)</td>
<td>92(46%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>18(9%)</td>
<td>182(91%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>126(38%)</td>
<td>274(62%)</td>
<td>400(100%)</td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data

Calculated Value of $\chi^2$ test = 93.84776 Table value of $\chi^2_{0.05}=3.84$

From the table 4.28 it is inferred that 54 percent of the organic farmers did seed cultivation in their field. But 91 percent of the inorganic farmers didn’t cultivate the seed in their field. It shows most of inorganic farmers depend on seed bank. So, nowadays old generation used seeds are not available; hybrid variety seeds cannot be planted for second generation, because the seed distributors are arresting the germination ability by using terminator seed technology. So the farmers should preserve the seeds for prolonged periods. Organic farmers are interested to cultivate seeds but inorganic farmers are not interested much. The calculated value of $\chi^2$ is 93.84776, which is greater than the table value of 3.84. There is a significant difference between the organic farmers and inorganic farmers regarding seed cultivation. Organic farmers are interested to cultivate seeds but inorganic farmers are not interested much.
CHART - 4.28

SEED CULTIVATION

Inorganic farmers
18
182

Organic farmers
100
92

Did
Didn't
TABLE - 4.29
SEED GERMINATION

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Seed Germination</th>
<th>Good</th>
<th>Not Good</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>78( 72%)</td>
<td>30(28%)</td>
<td>108 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>9(50%)</td>
<td>9(50%)</td>
<td>18 (100%)</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>87(69%)</strong></td>
<td><strong>39(31%)</strong></td>
<td><strong>126 (100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

Calculated Value of $\chi^2$ test = 3.564987 Table value of $\chi^2_{0.05}$=3.84

The above table 4.29 inculcates that 72 percent of the organic farmers cultivated seeds have good germination; but only 50 percent of the seeds have good germination out of 18 inorganic farmers. 69 percent of the farmers are accepted that is seed germination is good. So, inorganic farmers cultivating defective seeds scientific persons only can reveal this germination problem. Germination is the process in which a plant or fungus emerges from a seed or spore, respectively, and begins growth and it is shown in the Figure 7.

Seed germination depends on both internal and external conditions. The most important external factors include temperature, water, oxygen and sometimes light or darkness. Various plants require different variables for successful seed germination. Often this depends on the individual seed variety and is closely linked to the ecological conditions of a plant's natural habitat.
The calculated value of $\chi^2$ is 3.564987 which is less than the table value of 3.84. There is no significant difference between views of organic and inorganic farmers about germination power of the seeds will be good in the organic farming. Organic farmers cultivating seeds has good germination power than inorganic farmers. Hence the second hypothesis which states that the continuous uses of inorganic farming practices have toxic effects on seed quality is proved correct.
CHART - 4.29

SEED GERMINATION

- Organic farmers
- Inorganic farmers

Legend:
- Good
- Not Good

Values:
- Organic farmers:
  - Good: 78
  - Not Good: 30
- Inorganic farmers:
  - Good: 0
  - Not Good: 0
**TABLE - 4.30**

**RECOMMENDED DOSE**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Recommended Dose</th>
<th>Followed</th>
<th>Not Followed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>20(10%)</td>
<td>180(90%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>28(14%)</td>
<td>172(86%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>48(12%)</strong></td>
<td><strong>352(88%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

Calculated Value of $\chi^2$ test $= 1.515152$  
Table value of $\chi^2_{0.05}=3.84$

The above table 4.30 shows, organic farmers optioned that 10 percent of inorganic farmers are found to be following recommended dosage of fertilizer, pesticides and herbicides as well as inorganic farmers also accepted the same in 14 percent. So, overall 88 percent of farmers are not followed recommended dosage. And 86 percent of the inorganic farmers are not following recommended dosage of fertilizer, pesticides and herbicides. The calculated value of $\chi^2$ is 1.515152 which is less than the table value of 3.84. There is no significant difference between beliefs of organic and inorganic farmers about usage of recommended dose of fertilizers depends upon farmers’ attitude not in the prescribed dosage. Overdose of fertilizing will partly or entirely kill the crops and spoil soil fertility. **Hence the second hypothesis which states that the continuous uses of inorganic farming practices have toxic effects on soil fertility is proved correct.**
TABLE - 4.31

FOOD WEB AND FOOD CHAIN IN FARMING

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Food web &amp; Food Chain</th>
<th>Organic farming</th>
<th>Inorganic Farming</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>25 (13%)</td>
<td>175 (87%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>21 (11%)</td>
<td>179 (89%)</td>
<td>200(100%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>46 (12%)</td>
<td>354 (88%)</td>
<td>400(100%)</td>
</tr>
</tbody>
</table>

Source: Compiled from Primary Data

Calculated Value of $\chi^2$ test = 0.393024 Table value of $\chi^2_{0.05}$=3.84

The above table 4.31 examines that 87 percent of the organic farmers and 89 percent of inorganic farmers are warning about food web and food chain is affected by use of inorganic farming practices. It is found that 13 percent of the organic farmers and 11 percent of inorganic farmers are observed food web and food chain is not affected by use of inorganic farming practices.

In addition to 88 percent of the farmers told that food web and food chain is affected by use of inorganic farming practices. So, food web and food chain will not affect by use of organic farming. Chart 4.31 clearly shows inorganic farming practices affect the food chain and food web.

Inorganic farming is mischief to ecosystem, network of soil microorganisms, earth worms, bees, birds, fish, aquatic organisms, fungi and beneficial insects and also demolishes many of others habitats. Organic farmers
are following traditional technologies such as light trap, colour trap, sex paramone trap and fumigation in their field. But inorganic farmers are following such traditional technologies. The calculated value of $\chi^2$ is 0.393024 which is less than the table value of 3.84. There is no significant difference between viewpoints of organic and inorganic farmers about inorganic farming practices have toxic effects of food chain and food web. **Hence the second hypothesis which states that the continuous uses of inorganic farming practices have toxic effects on food chain and food web is proved correct.**
CHART - 4.31

EFFECT OF INORGANIC FARMING PRACTICES CHAIN AND FOOD WEB
TABLE – 4.32

EFFECT OF INORGANIC FARMING PRACTICES ON ENVIRONMENT

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Effect of Inorganic farming practices on Environment</th>
<th>Fertilizer</th>
<th></th>
<th>Pesticides</th>
<th></th>
<th>Herbicides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
<td>Affected</td>
<td>Not Affected</td>
</tr>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>197</td>
<td>3</td>
<td>200</td>
<td>189</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(99%)</td>
<td>(1%)</td>
<td>(100%)</td>
<td>(95%)</td>
<td>(5%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>192</td>
<td>8</td>
<td>200</td>
<td>196</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(96%)</td>
<td>(4%)</td>
<td>(100%)</td>
<td>(98%)</td>
<td>(2%)</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>389</td>
<td>11</td>
<td>400</td>
<td>385</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(97%)</td>
<td>(3%)</td>
<td>(100%)</td>
<td>(96%)</td>
<td>(4%)</td>
</tr>
</tbody>
</table>

Calculated $\chi^2 = \sum[(O-E)^2/E]$ = 2.336995, 3.393939, 3.603604

Source: Compiled from Primary Data

Sample Size: 400

Table value of $\chi^2_{0.05}=3.84$
The table 4.32 explains that 97 percent of the farmers are strongly insisting that environment is polluted by fertilizers, 96 percent of the farmers are insisting that environment is polluted by pesticides and also 93 percent of the farmers are insisting that environment is polluted by herbicides. There is no significant difference between organic and inorganic farmers. Environment is absolutely polluted by use of fertilizer, pesticides and herbicides. Environmental Protection Agency registration of a chemical doesn't mean that the chemical has been verified to be harmless.

The chemicals and nutrients found in fertilizers, while beneficial for agricultural crops, can be lethal in high doses for fish, birds and other wildlife. Pesticides, designed to kill pests chemically, are also dangerous when leached into soil or groundwater supplies. Heavy amounts of fertilizer chemicals like potassium, nitrogen and phosphorus in natural water systems can actually cause "dead zones" where wildlife cannot survive because of lower oxygen levels and chemical poisoning.

From the Chi-square tests table 4.32, the significant value of fertilizer is 2.336995, Pesticides is 3.393939 and herbicides is 3.603604 which are less than the table value 3.84; there is no significant variation between organic and inorganic farmers point of view inorganic farming affects beneficial insects and organisms like honeybees and soil microbes can be killed alongside the pests, eliminating some of the ecosystem beneficial to crop health and sustainability. Therefore the second hypothesis which states that the continuous uses of inorganic farming practices have toxic effects on environment is proved correct.
EFFECT OF INORGANIC FARMING PRACTICES ON ENVIRONMENT

- Affected Not affected
- Fertilizer, Pesticides, Herbicides

- Organic farmers

- 180-200
- 160-180
- 140-150
- 120-140
- 100-120
- 80-100
- 60-80
- 40-60
- 20-40
- 0-20
4.5.3. Research Hypothesis - III

The third hypothesis which states that the chemical mixture has significantly affected the quality of water and also polluted air. Chi-square test is used to find out the adverse the impact of fertilizers and pesticides on

- water, and
- air.

The third hypothesis is tested on the basis of above two heads.
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Effect of Inorganic farming practices on water</th>
<th>Fertilizer</th>
<th></th>
<th>Pesticides</th>
<th></th>
<th>Herbicides</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>194 (97%)</td>
<td>6 (3%)</td>
<td>200 (100%)</td>
<td>196 (98%)</td>
<td>4 (2%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>192 (96%)</td>
<td>8 (4%)</td>
<td>200 (100%)</td>
<td>190 (95%)</td>
<td>10 (5%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>386 (97%)</td>
<td>14 (3%)</td>
<td>400 (100%)</td>
<td>386 (97%)</td>
<td>14 (3%)</td>
<td>400 (100%)</td>
</tr>
</tbody>
</table>

Calculated $\chi^2 = \sum [(O-E)^2/E] = 0.296077$ $\chi^2 = 2.664693$ $\chi^2 = 3.393939$

\textbf{Source:} Compiled from Primary Data  \hspace{1cm} \textbf{Sample Size:} 400  \hspace{1cm} \textbf{Table value of $\chi^2_{0.05}=3.84$}
As shown in the table 4.33, 97 percent of the farmers are informing that water is polluting and changing taste particularly by using of fertilizer and pesticides. 96 percent of the farmers are informing that water is polluting by using of herbicides. Inorganic fertilizers, pesticides and herbicides can actually pollute groundwater, river water and lake water that we use for drinking.

Fertilizer run-off can pollute water systems. When fertilizer washes into streams and rivers, it can build up, causing gentrification (excessive growth due to a surplus of nutrients). Nitrogen and phosphorus are nutrients found naturally in the air and in water systems. Fertilizer run-off dumps too many of these nutrients into the water. The result, algal bloom, occurs when water plants become invasive. Fish are unable to get the nutrients and oxygen they need from the water. Chemical and organic fertilizers can contaminate groundwater and surface water like lakes and rivers, which can damage aquatic ecosystems and endanger human health.

Repeated applications of fertilizer to large crops can take a toll on the surrounding soil environment. Fertilizer materials consist of concentrated mixes of nitrogen, phosphorous and potassium, which can strain soil ecosystems over time. Nitrogen, in particular, is a highly water-soluble material that can quickly move through soil layers, according to Parkseed, a gardening resource site. In addition to fertilizer materials, agricultural producers typically use pesticide agents to prevent insects, bacteria and fungus from destroying crop yields, according to Pest Management at the Crossroads, a pesticide
reference site. When combined, fertilizers and pesticides can further strain soil environments, causing excess chemicals to seep into groundwater supplies and, ultimately, contaminate public drinking water supplies.

Chemical fertilizers could be formed to be "slow-release," only these kinds cost many times as much as those that dissolve quickly in water. Applied excessively or too liberally, inorganic fertilizers can be washed and transported by rain into water sources (such as rivers and lakes) and end up polluting them. If this happens, it may result to an increase in growth of the several aquatic plants absorbs the oxygen from the atmosphere so the scarcity will occur and the population of aquatic animals are reduced gradually.

From the Chi-square tests table 4.33, the significant value of fertilizer is 0.296077, Pesticides is 2.664693 and herbicides is 3.393939 which are less than the table value 3.84; It proves that there is no significant variation between organic and inorganic farmers opinion of inorganic farming affects the primary sources of drinking water such as river, lake and pond pollute by pesticides and other chemicals contribute to water pollution and also contaminate ground water. Hence the third hypothesis which states that the chemical mixture has significantly affected the quality of water is proved correct.
### TABLE – 4.34

**EFFECT OF INORGANIC FARMING PRACTICES ON AIR**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Effect of Inorganic farming practices on air</th>
<th>Fertilizer</th>
<th>Pesticides</th>
<th>Herbicides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>185 (93%)</td>
<td>15 (7%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>174 (87%)</td>
<td>26 (13%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>359 (90%)</strong></td>
<td><strong>41 (10%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
<tr>
<td></td>
<td>Calculated $\chi^2 = \sum[(O-E)^2/E]$</td>
<td>3.288267</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*

*Sample Size: 400*

*Table value of $\chi^2_{0.05} = 3.84$*
According to the table 4.34, 90 percent of the farmers are notifying that air is polluted by using of fertilizer, 93 percent of the farmers are notifying that air is polluted by using of pesticides and also 57 percent of the farmers are notifying that air is polluting by using of herbicides.

From the Chi-square tests table 4.34, the significant value of fertilizer is 3.288267, Pesticides is 1.382488 and herbicides is 3.677014 which are less than the table value 3.84; there is no significant variation between organic and inorganic farmers opinion of sprinkling or spraying the pesticides, fertilizer and herbicides are polluting air enormously and it is infectious to human’s respiratory system. **Hence the third hypothesis which states that the chemical mixture has significantly polluted air is proved correct.**

**AIR POLLUTED BY SPRINKLING PESTICIDES**

![Figure 8](image_url)
4.5.4. Research Hypothesis - IV

The Fourth hypothesis which states that the inorganic farming practice has significantly reduced the Crop quality and destroyed earthworms and microorganisms.

Chi-square test is used to find out the adverse the impact of fertilizers and pesticides on

- crops, and
- earthworms and micro organisms.

The fourth hypothesis is tested on the basis of above two heads.
### TABLE – 4.35

**EFFECT OF INORGANIC FARMING PRACTICES ON CROPS**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Effect of Inorganic farming practices on crops</th>
<th>Fertilizer</th>
<th></th>
<th>Pesticides</th>
<th></th>
<th>Herbicides</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>42 (21%)</td>
<td>158 (79%)</td>
<td>200 (100%)</td>
<td>156 (78%)</td>
<td>44 (22%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>28 (14%)</td>
<td>172 (86%)</td>
<td>200 (100%)</td>
<td>140 (70%)</td>
<td>60 (30%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>70 (18%)</strong></td>
<td><strong>330 (82%)</strong></td>
<td><strong>400 (100%)</strong></td>
<td><strong>296 (74%)</strong></td>
<td><strong>104 (26%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
</tbody>
</table>

Calculated \( \chi^2 = \sum [(O-E)^2/E] \) = 3.393939, 3.326403, 1.70258

*Source: Compiled from Primary Data*  
*Sample Size: 400*  
*Table value of \( \chi^2_{0.05} = 3.84 \)*
The table 4.35 shows that, 82 percent of the farmers are noticing that crops are not affected by using of fertilizer. And 74 percent of the farmers are noticing that crops are affected by using of pesticides shows in the Figure 10. And also 90 percent of the farmers are noticing that crops are affected by using of herbicides shows in the Figure 9.

Crops are not affected by fertilizers but they insist if it is in excessive use will be harm to crops and crops are affected by herbicides and pesticides. Changed the crop colour as pale yellow or while patches in the leaf when they applying herbicides in the field. As inorganic fertilizers are both powerful and take effect too quickly, they can burn and totally destroy plants when applied excessively.

As fertilizers seep into groundwater supplies and permeate soil ecosystems, both water and plant crops absorb the nitrates in the soil. Certain vegetables, such as spinach, broccoli and cauliflower, naturally absorb more nitrate materials than other plant types. According to the Agency for Toxic Substances and Disease Registry, the vegetables consumed by humans provide as much as 70 percent of the nitrates present within a daily diet. Food contamination also occurs in the form of color-enhancing agents, which are used as meat preservatives. Commercial baby food products as well as the water used to dilute baby formula also contain nitrate materials.

From the Chi-square tests table 4.35, the significant value of fertilizer is 3.393939, Pesticides is 3.326403 and herbicides is 1.70258 which are less than
the table value 3.84; which shows that there is no significant variation between organic and inorganic farmers opinion of fertilizers can improve the appearance and health of your lawn or garden, but they can also create health and environmental dangers. Fertilizers can pollute groundwater, endanger children and pets, disturb aquatic life and even damage your grass. **Hence the fourth hypothesis which states that the inorganic farming practice has significantly reduced the Crop quality is proved correct.**
AFTER APPLICATION OF HERBICIDES IN CROPS

Figure 9

AFTER APPLICATION OF PESTICIDE

Figure 10
EFFECT OF INORGANIC FARMING PRACTICES ON CROPS

- Organic farmers
- Inorganic farmers
### Table 4.36

**Effect of Inorganic Farming Practices on Earthworm and Microorganisms**

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Effect of Inorganic farming practices on Earthworm and microorganism</th>
<th>Fertilizer</th>
<th>Pesticides</th>
<th>Herbicides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>198  (99%)</td>
<td>2</td>
<td>200</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>192  (97%)</td>
<td>8</td>
<td>200</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>390  (98%)</td>
<td>10</td>
<td>400</td>
</tr>
</tbody>
</table>

Calculated $\chi^2 = \sum \frac{(O-E)^2}{E}$

| $\chi^2$ | 3.692308 | 3.692308 | 3.692308 |

*Source: Compiled from Primary Data*

*Sample Size: 400*

*Table value of $\chi^2_{0.05} = 3.84$*
The table 4.36 explains that 98 percent of the farmers are forcefully insisting that earthworm and microorganisms are removed by fertilizers, pesticides and herbicides. Many pesticides own high acid content. Acids in chemical fertilizers, like sulfuric acid and hydrochloric acid, go to high soil acidity which would successively result in the death of nitrogen-fixing bacterium, the microorganism that works a central role in furnishing a maturing plant's nitrogen demands. Many chemical fertilizers own high acid content.

From the Chi-square tests table 4.36, the significant value of fertilizer is 3.692308, Pesticides is 3.692308 and herbicides is 3.692308 which are less than the table value 3.84; which shows that there is no significant variation between organic and inorganic farmers point of view of using of inorganic fertilizers, kills earthworms and microorganisms in the soil that help in the plants' growth. **Hence the fourth hypothesis which states that the inorganic farming practice has significantly destroyed earthworms and microorganisms is proved correct.**
<table>
<thead>
<tr>
<th>S.No.</th>
<th>Effect of Inorganic farming practices on changes in colour, odour and taste on crops</th>
<th>Fertilizer</th>
<th>Pesticides</th>
<th>Herbicides</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Affected</td>
<td>Not Affected</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>Organic farmers</td>
<td>186 (93%)</td>
<td>14 (7%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td>2</td>
<td>Inorganic farmers</td>
<td>175 (88%)</td>
<td>25 (12%)</td>
<td>200 (100%)</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>361 (90%)</strong></td>
<td><strong>39 (10%)</strong></td>
<td><strong>400 (100%)</strong></td>
</tr>
<tr>
<td></td>
<td>Calculated $\chi^2 = \sum[(O-E)^2/E]$</td>
<td>3.437744</td>
<td>1.820327</td>
<td>1.041667</td>
</tr>
</tbody>
</table>

*Source: Compiled from Primary Data*  
*Sample Size: 400*  
*Table value of $\chi^2_{0.05}=3.84$*
The table 4.37 explains that overall 90 percent of the farmers are reporting that colour of the crops (that are grown for food) colour has been changing by the use of fertilizer, and 87 percent of the farmers are insisting that crops odour has been changing by the use of pesticides, and also 96 percent of the farmers are warning that crops taste has been changing by the use of herbicides, it is showed in Chart 4.37.

Crops colour, odour and taste are changing by the use of herbicides, fertilizer and pesticides.
CHART - 4.37

EFFECT OF INORGANIC FARMING PRACTICES ON
CHANGES IN COLOUR, ODOUR AND TASTE ON CROPS

Herbicides 35%

Fertilizer 35%

Pesticides 32%