LIST OF TABLES

Table 1. Soil analysis at sowing and related data of experimental sites

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 2013-14 | | | | | | | | | | |
| **Experimental Site** | **EC (dS m-1)** | **pH** | **OM%** | **Available P (ppm)** | **Extractable K (ppm)** | **Texture** | **Previous**  **Crop** | **Date of sowing** | **Date of harvesting** | **Onion variety** |
| Site-1 | 1.60 | 8.4 | 0.34 | 2.2 | 80 | Loam | Rice | 13/01/2014 | 02/05/2014 | Dark Red |
| Site-2 | 2.05 | 7.9 | 0.68 | 12.5 | 240 | Loam | Wheat | 12/01/2014 | 02/05/2014 | Phulkara |
| Site-3 | 2.32 | 8.1 | 0.77 | 10.7 | 200 | Loam | Sorghum | 21/12/2013 | 20/05/2014 | Phulkara |
| Site-4 | 3.86 | 8.3 | 0.91 | 7.1 | 160 | Loam | Wheat | 13/12/2013 | 05/05/2014 | Phulkara |
| Site-5 | 2.90 | 7.9 | 0.96 | 9.1 | 200 | Loam | Millet grain | 28/12/2013 | 06/05/2014 | Phulkara |
| **Range** | 1.60-3.86 | 7.9-8.4 | 0.34-0.96 | 2.2-10.7 | 160-240 |  | | | | |
| 2014-15 | | | | | | | | | | |
| Site-1 | 2.30 | 8.3 | 0.86 | 4.0 | 214 | Clay Loam | Rice | 17/12/2014 | 22/04/2015 | Dark Red |
| Site-2 | 2.10 | 8.2 | 1.19 | 7.8 | 280 | Loam | Wheat | 30/01/2015 | 20/05/2015 | Phulkara |
| Site-3 | 1.76 | 8.1 | 0.98 | 5.2 | 178 | Loam | Fallow | 26/12/2014 | 03/05/2015 | Phulkara |
| Site-4 | 1.82 | 8.1 | 0.87 | 5.7 | 203 | Loam | Radish | 24/12/2014 | 02/05/2015 | Phulkara |
| Site-5 | 2.04 | 8.0 | 0.82 | 4.6 | 185 | Loam | Maize | 28/2/2015 | 25/05/2015 | Phulkara |
| **Range** | 1.76-2.30 | 8.0-8.3 | 0.82-1.19 | 4.0-7.8 | 185-280 |  | | | | |
| 2015-16 | | | | | | | | | | |
| Site-1 | 2.04 | 8.2 | 0.84 | 6.3 | 60 | Loam | Sugarcane | 02/01/2016 | 03/05/2016 | Phulkara |
| Site-2 | 1.92 | 8.2 | 0.77 | 9.2 | 240 | Loam | Cotton | 27/12/2015 | 17/05/2016 | Phulkara |
| Site-3 | 2.33 | 7.8 | 0.72 | 4.1 | 180 | Loam | Turnip | 29/12/2015 | 15/04/2016 | Phulkara |
| Site-4 | 1.14 | 8.1 | 0.63 | 4.9 | 100 | Loam | Sugarcane | 25/01/2016 | 02/05/2016 | Phulkara |
| **Range** | 1.92-2.33 | 7.8-8.2 | 0.63-0.84 | 4.1-9.2 | 100-240 |  | | | | |
| 2016-17 | | | | | | | | | | |
| Site-1 | 1.00 | 8.0 | 0.67 | 7.2 | 184 | Loam | Rice | 08/02/2017 | 25/05/2017 | Nasar Puri |
| Site-2 | 1.00 | 8.4 | 0.55 | 5.1 | 204 | Loam | Sorghum Fodder | 10/12/2016 | 01/05/2017 | Dark Red |
| Site-3 | 1.78 | 8.1 | 0.56 | 5.7 | 180 | Loam | Sugarcane | 04/03/2017 | 07/06/2017 | Nasar Puri |
| Site-4 | 3.40 | 8.2 | 0.78 | 7.2 | 120 | Loam | Cotton | 08/02/2017 | 23/05/2017 | Nasar Puri |
| Site-5 | 1.93 | 8.2 | 0.84 | 5.1 | 180 | Loam | Rice | 04/01/2017 | 09/05/2017 | Phulkara |
| Site-6 | 0.93 | 7.8 | 0.67 | 2.1 | 170 | Loam | Vegetables | 16/02/2017 | 15/06/2017 | Phulkara |
| Site-7 | 1.58 | 8.1 | 0.84 | 6.7 | 170 | Loam | Cauliflower | 02/03/2017 | 09/06/2017 | Phulkara |
| Site-8 | 3.12 | 8.1 | 0.78 | 7.2 | 120 | Loam | Sweet Potato | 01/02/2017 | 18/05/2017 | Phulkara |
| Site-9 | 3.50 | 8.4 | 0.83 | 6.9 | 160 | Loam | Wheat | 05/02/2017 | 24/05/2017 | Phulkara |
| Site-10 | 3.40 | 8.4 | 0.71 | 7.9 | 130 | Loam | Sorghum fodder | 16/02/2017 | 06/06/2017 | Phulkara |
| Site-11 | 2.13 | 8.1 | 0.91 | 7.3 | 180 | Loam | Maize | 08/12/2016 | 05/05/2017 | Desi Phulkara |
| Site-12 | 1.93 | 8.0 | 0.56 | 5.9 | 140 | Loam | Carrot | 17/03/2017 | 25/05/2017 | Dark Red |
| \**Range** | 1.00-3.5 | 8.0-8.4 | 0.55-0.91 | 2.1-7.9 | 140-204 |  | | | | |
| 2017-18 | | | | | | | | | | |
| Site-1 | 1.90 | 8.1 | 0.60 | 2.0 | 180 | Loam | Rice | 19/12/2017 | 23/04/2018 | Dark Red |
| Site-2 | 1.98 | 8.1 | 0.84 | 6.1 | 190 | Loam | Maize | 03/01/2018 | 10/04/2018 | Phulkara |
| Site-3 | 1.14 | 7.8 | 0.84 | 5.1 | 180 | Loam | Sugarcane | 16/02/2018 | 12/05/2018 | Phulkara |
| Site-4 | 2.74 | 7.6 | 1.01 | 4.1 | 140 | Loam | Sorghum Fodder | 15/02/2018 | 05/05/2018 | Phulkara |
| Site-5 | 1.80 | 8.1 | 0.72 | 6.3 | 195 | Loam | Maize | 13/02/2018 | 07-05-2018 | Dark Red |
| **Range** | 1.14-2.74 | 7.6-8.1 | 0.60-1.01 | 2.0-6.3 | 140-195 |  | | | | |
| 2018-19 | | | | | | | | | | |
| Site-1 | 1.60 | 8.2 | 0.69 | 5.4 | 111 | Loam | Cabbage | 18/01/2019 | 08/05/2019 | Phulkara |
| Site-2 | 1.30 | 7.6 | 0.64 | 1.5 | 102 | Loam | Sorghum | 16/12/2018 | 28/04/2019 | Dark Red |
| Site-3 | 1.99 | 8.1 | 0.83 | 8.9 | 110 | Loam | Rice | 21/12/2018 | 06/05/2019 | Dark Red |
| Site-4 | 2.73 | 8.1 | 0.77 | 5.4 | 190 | Loam | Maize Fodder | 03/02/2019 | 03/05/2019 | Nasar Puri |
| Site-5 | 1.98 | 8.0 | 0.84 | 6.9 | 210 | Loam | Pumpkin | 20/02/2019 | 11/05/2019 | Dark Red |
| Site-6 | 3.20 | 8.3 | 0.62 | 7.9 | 120 | Loam | Fallow | 15/01/2019 | 24/04/2019 | Phulkara |
| Site-7 | 3.10 | 8.2 | 0.77 | 7.8 | 100 | Loam | Fodder | 18/01/2019 | 29/04/2019 | Phulkara |
| **Range** | 1.30-3.20 | 7.6-8.3 | 0.62-0.84 | 1.5-8.9 | 100-210 |  | | | | |

Table 2. Response of onions to graded NPK fertilizer doses (Study in 1st year, 2013-14)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nutrients (Kg ha-1) | | | | Onion bulb yield (t ha-1) | | | | | |
| Tr. No. | N | P2O5 | K2O | Site-1 | Site-2 | Site-3 | Site-4 | Site-5 | (First Year) |
| 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | Pooled annual average 5(15R)\* |
| 1 | 100 | 160 | 100 | 7.71D | 13.28C | 13.72C | 21.52 | 20.00C | 15.25C |
| 2 | 100 | 210 | 100 | 13.78C | 15.76B | 16.20B | 23.52 | 21.11B | 18.08B |
| 3 | 100 | 260 | 100 | 15.17B | 16.38A | 16.87A | 24.03 | 21.89AB | 18.87AB |
| 4 | 100 | 310 | 100 | 17.03A | 16.49A | 16.91A | 24.22 | 21.99A | 19.33A |
| LSD 0.05 | | | | 0.63 | 0.15 | 0.16 | N.S. | 0.78 | 1.01 |

\*No. of experiments (replications)

Table 3. Response of onions to graded NPK fertilizer doses (Study in 2nd year, 2014-15)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nutrients (Kg ha-1) | | | | Onion bulb yield (t ha-1) | | | | | |
| Tr. No. | N | P2O5 | K2O | Site-1 | Site-2 | Site-3 | Site-4 | Site-5 | (Second Year) |
| 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | Pooled annual average 5(15R)\* |
| 1 | 100 | 160 | 100 | 16.77C | 12.89D | 21.52 | 13.70C | 15.23C | 15.23C |
| 2 | 100 | 210 | 100 | 18.12BC | 15.44C | 23.52 | 18.83B | 17.80B | 17.80B |
| 3 | 100 | 260 | 100 | 19.04B | 16.07B | 23.89 | 20.18A | 18.60B | 18.60B |
| 4 | 100 | 310 | 100 | 23.37A | 16.35A | 24.44 | 20.35A | 19.73A | 19.73A |
| LSD 0.05 | | | | 1.78 | 0.20 | N.S. | 0.47 | 0.31 | 1.01 |

\*No. of experiments (replications)

Table 4. Response of onions to graded NPK fertilizer doses (Study in 3rd year, 2015-16)

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nutrients (Kg ha-1) | | | | Onion bulb yield (t ha-1) | | | | |
| Tr. No. | N | P2O5 | K2O | Site-1 | Site-2 | Site-3 | Site-4 | (Third Year) |
| 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | Pooled annual average 4(12R)\* |
| 1 | 100 | 160 | 100 | 14.44C | 22.04 | 14.82 | 15.35D | 16.66C |
| 2 | 100 | 210 | 100 | 17.19B | 23.78 | 19.94 | 18.02B | 19.73B |
| 3 | 100 | 260 | 100 | 17.75A | 24.29 | 21.296 | 18.85C | 20.55AB |
| 4 | 100 | 310 | 100 | 17.96A | 25.00 | 21.46 | 19.14D | 20.89A |
| LSD 0.05 | | | | 0.37 | N.S. | 0.45 | 0.08 | 0.97 |

\*No. of experiments (replications)

Table 5a. Response of onions to graded NPK fertilizer doses (Study in 4rth year, 2015-16) Part 1

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nutrients (Kg ha-1) | | | | Onion bulb yield (t ha-1) | | | | | | |
| Tr. No. | N | P2O5 | K2O | Site-1 | Site-2 | Site-3 | Site-4 | Site-5 | Site-6 | Site-7 |
| 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* |
| 1 | 100 | 160 | 100 | 23.52D | 16.01C | 14.20B | 12.61C | 15.70C | 14.04C | 16.52B |
| 2 | 100 | 210 | 100 | 24.15C | 17.49B | 15.29A | 15.06B | 17.33B | 14.98B | 19.22A |
| 3 | 100 | 260 | 100 | 25.29B | 17.83B | 16.09A | 15.84A | 18.85A | 15.82A | 19.85A |
| 4 | 100 | 310 | 100 | 26.15A | 20.63A | 16.29A | 16.07A | 18.41A | 16.00A | 20.02A |
| LSD 0.05 | | | | 0.41 | 0.58 | 0.45 | 0.46 | 0.71 | 0.43 | 1.18 |

\*No. of experiments (replications)

Table 5b. Response of onions to graded NPK fertilizer doses (Study in 4rth year, 2015-16) Part 2

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nutrients (Kg ha-1) | | | | Onion bulb yield (t ha-1) | | | | | |
| Tr. No. | N | P2O5 | K2O | Site-1 | Site-2 | Site-3 | Site-4 | Site-5 | (Fourth Year) |
| 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | Pooled annual average 12(36R)\* |
| 1 | 100 | 160 | 100 | 21.24C | 11.48C | 12.44B | 14.89C | 10.59D | 15.27D |
| 2 | 100 | 210 | 100 | 25.06B | 13.78B | 14.59A | 16.78B | 11.48C | 17.10C |
| 3 | 100 | 260 | 100 | 26.60A | 14.70A | 15.26A | 18.15A | 13.37B | 18.14B |
| 4 | 100 | 310 | 100 | 26.73A | 14.91A | 15.74A | 18.29A | 14.37A | 18.63A |
| LSD 0.05 | | | | 0.27 | 0.66 | 1.20 | 0.25 | 0.75 | 0.31 |

\*No. of experiments (replications)

Table 6. Response of onions to graded NPK fertilizer doses (Study in 5th year, 2017-18)

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nutrients (Kg ha-1) | | | | Onion bulb yield (t ha-1) | | | | | |
| Tr. No. | N | P2O5 | K2O | Site-1 | Site-2 | Site-3 | Site-4 | Site-5 | (Fifth Year) |
| 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | Pooled annual average 5(15R)\* |
| 1 | 100 | 160 | 100 | 8.79C | 14.53D | 16.92D | 13.74D | 13.270C | 13.45C |
| 2 | 100 | 210 | 100 | 10.35B | 16.14C | 18.92C | 15.67C | 15.29B | 15.28B |
| 3 | 100 | 260 | 100 | 10.8AB | 17.24B | 20.02B | 16.73B | 17.29A | 16.49A |
| 4 | 100 | 310 | 100 | 11.39A | 17.47A | 20.12A | 17.11A | 17.82A | 16.78A |
| LSD 0.05 | | | | 0.88 | 0.12 | 0.05 | 0.09 | 0.41 | 0.32 |

\*No. of experiments (replications)

Table 7. Response of onions to graded NPK fertilizer doses (Study in 6th year, 2018-19) and pooled results

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nutrients (Kg ha-1) | | | | Onion bulb yield (t ha-1) | | | | | | | | |
| Tr. No. | N | P2O5 | K2O | Site-1 | Site-2 | Site-3 | Site-4 | Site-5 | Site-6 | Site-7 | (Sixth Year) | **Pooled average of 6 years 38(114R)**\* |
| 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | 1(3R)\* | Pooled annual average 7(21R)\* |
| 1 | 100 | 160 | 100 | 13.47D | 16.09D | 11.33C | 14.19D | 14.05D | 17.81D | 20.03B | 15.28D | 15.17D |
| 2 | 100 | 210 | 100 | 15.47C | 17.03C | 12.56B | 16.09C | 15.78C | 18.36C | 23.56A | 16.98C | 17.34C |
| 3 | 100 | 260 | 100 | 18.25B | 17.80C | 14.98A | 17.38B | 16.82B | 18.56B | 24.88A | 18.38B | 18.38B |
| 4 | 100 | 310 | 100 | 21.98A | 21.24A | 15.19A | 17.71A | 16.98A | 18.68A | 24.99A | 19.54A | 19.03A |
| LSD 0.05 | | | | 1.91 | 0.54 | 0.23 | 0.17 | 0.06 | 0.11 | 1.86 | 0.75 | 0.27 |

\*No. of experiments (replications)

Table 8. Economic analysis and marginal rate of return for onion production as inﬂuenced by different fertilizer doses

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Nutrients (Kg ha-1) | | | | | | . Economic analysis and marginal rate of return (t ha-1) | | | | | |
| Tr. No. | N | P2O5 | K2O | Fertilizer cost (Rs ha-1) | Onion bub yield (t ha-1) | Increase over T1 (t ha-1) | Increase over T1 (percentage) | Gradual increase (percentage) | Gross turn around  (Rs ha-1) | Gross Margin=(Gross turnaround- Cost of nutrients)  (Rs ha-1) | Gradual increase in Gross Margin (Rs ha-1) |
| 1 | 100 | 160 | 100 | 37280 | 15.17 | 0 | 0 |  | 561327 | 524047 |  |
| 2 | 100 | 210 | 100 | 43430 | 17.33 | 2.165 | 14.27 | 14.27 | 641432 | 598002 | 73955 |
| 3 | 100 | 260 | 100 | 49580 | 18.38 | 3.205 | 21.13 | 6.00 | 679912 | 630332 | 32330 |
| 4 | 100 | 310 | 100 | 55730 | 19.03 | 3.86 | 25.44 | 3.56 | 704147 | 648417 | 18085 |