# Knowledge Level of Sustainable Cultivation Practices followed by Strawberry Growers

*Patil R.L.[1], Mujawar R.H.[1], Gaikwad S.S.[1]*

***Abstract:*** *The strawberry is a widely grown hybrid species of the genus Fragaria. It is cultivated worldwide for its fruit. The fruit is widely appreciated for its characteristics aroma, bright red color, juicy texture and sweetness. The present study on knowledge level of sustainable cultivation practices followed by strawberry growers was undertaken in Mahabaleshawar tehsil of Satara district region of western Maharashtra State with sample size of 110 respondents from 6 villages. Data were collected on personal, socio-economic, communicational and psychological profile of farmers and knowledge and adoption sustainable practices was certain by using exploratory design of social research. Data from the respondents were collected by personally interviewing with the help of present and well- structured interview schedule. Thus, data was collected and appropriated to statistical analysis. Particularly knowledge greater per cent of respondents 62.72 per cent have medium level of knowledge about the sustainable cultivation practices followed in strawberry cultivation.*

***Keywords:*** *Constraints, Strawberry Cultivation and Suggestions*

## INTRODUCTION

In an agrarian country like India national income is born by agricultural industries. The knowledge of sustainable cultivation practices by the farmers therefore, become imperative, to increase agricultural production.

Strawberry is important fruit crop of India and its commercial production is possible in temperate and subtropical climate in India. It is generally cultivated in the hills. Strawberry is also successfully cultivated in plains also in Maharashtra around Pune ,Nashik and Sangali districts of Maharashtra. It is cultivated commercially in Himachal Pradesh , Uttar Pradesh, Maharashtra, West Bengal, Nilgiri hills, Delhi, Haryana, Kashmir valley and Punjab. Main centres of strawberry cultivation are Nainital (Himachal Pradesh), Deharadun (Uttarakhnd), Mahabaleshwar (Maharashtra), Kashmir valley, Benglore, Kalimpong (West Bengal). In Mahabaleshwar tahsil area under strawberry cultivation was 850 ha. in which 1800 farmers were engaged which produces 20000 tonnes of strawberry which have an worth goes above 100 crore.

## METHODOLOGY

For the present study, Satara district is purposively selected as it has highest area under strawberry cultivation. In Satara district, the highest area in under strawberry cultivation in Mahabaleshwar tahsil, hence it was selected. The list of Strawberry growers from the selected villages was obtained from Agricultural assistant and agricultural supervisors of the respective villages. Total 110 respondents were selected by proportionate random sampling method for the present study.

## RESEARCH FINDINGS

### Practice wise knowledge of strawberry growers

The practice wise information pertaining to the knowledge level of strawberry growing the respondents about the sustainable cultivation practices were collected, tabulated and analyzed.

[1] Research Scholar, Department of Extension Education, Post Graduate Institute, MPKV Rahuri-413722 (M.S.) India, *Email: riteshlpatil92@gmail.com*

**Table 1**
**Distribution of the respondent according to Practice wise knowledge about sustainable cultivation practices.**

| Sr.no. | Statement | Full F | Full % | Partial F | Partial % | No F | No % |
|---|---|---|---|---|---|---|---|
| 1 | Land preparation | | | | | | |
| 1.1 | Land preparation helps in, | | | | | | |
| A | To Manage pest and weed incidence | 95 | 86.36 | 15 | 13.63 | - | - |
| B | To Increase infiltration rate | 97 | 88.18 | 13 | 11.81 | - | - |
| C | To Improve soil physical properties due to natural weathering | 92 | 83.63 | 18 | 16.36 | - | - |
| D | To Optimize nutrient availability | 102 | 92.72 | 8 | 7.27 | - | - |
| E | To Reduce erosion | 91 | 82.72 | 19 | 17.27 | - | - |
| F | To Increase the yield stability | 104 | 94.54 | 6 | 5.45 | - | - |
| G | To Balance nutrient flow | 101 | 91.81 | 9 | 8.18 | - | - |
| H | To It helps proper establishment of crop | 108 | 98.18 | 2 | 1.81 | - | - |
| i | To Enhance the uptake of nutrient from deeper layer | 102 | 92.72 | 8 | 7.27 | - | - |
| 1.2 | Ploughing the land | | | | | | |
| A | By using bullock power | 110 | 100 | - | - | - | - |
| B | By using tractor / power tiller | 110 | 100 | - | - | - | - |
| 1.3 | Which is best method of planting? | | | | | | |
| A | Flat bed | 110 | 100 | - | - | - | - |
| B | Raised bed | 110 | 100 | - | - | - | - |
| 1.4 | Do you have pollyhouse for planting of strawberry? | 81 | 73.63 | 24 | 21.81 | 5 | 4.54 |
| 2 | Nursery management | 23 | 20.90 | 43 | 39.09 | 44 | 40.00 |
| 2 | Cropping Intensity | | | | | | |
| 2.1 | For better soil fertility strawberry should be rotated with | | | | | | |
| A | Legumes | 72 | 65.45 | 11 | 10 | 27 | 24.54 |
| B | cereals | 13 | 11.81 | 76 | 69.90 | 21 | 19.09 |
| C | vegetables | 64 | 58.18 | 26 | 23.63 | 20 | 18.18 |
| D | d. all | 5 | 4.54 | 8 | 7.27 | 97 | 88.18 |
| 2.2 | Crop rotation helps to | | | | | | |
| A | Increase the yield stability | 88 | 80 | 12 | 10.90 | 10 | 9.09 |
| B | Reduce weeds, pest and disease incidence | 101 | 91.81 | 4 | 3.63 | 5 | 4.54 |
| C | Recycling nutrient reserves from depth in the soil | 102 | 92.72 | 5 | 4.54 | 3 | 2.72 |
| D | Increases the Arthropod diversity | 94 | 85.45 | 11 | 10 | 5 | 4.54 |
| E | Transfer N from N-fixing species | 85 | 77.27 | 13 | 11.81 | 12 | 10.90 |
| 3 | Planting | | | | | | |
| 3.1 | Do you know Spacing of raised beds ? | | | | | | |
| A | 4×3 m | 76 | 69.09 | 14 | 12.74 | 20 | 18.18 |
| B | 4×4 m | 83 | 75.45 | 12 | 10.90 | 15 | 13.63 |
| 3.2 | Which is the proper timing of planting? | | | | | | |
| A | March-April | 83 | 75.45 | 11 | 10 | 16 | 14.54 |
| B | September –October | 62 | 56.36 | 32 | 29.09 | 16 | 14.54 |
| C | November-December | 106 | 96.36 | 4 | 03.63 | - | - |
| 3.3 | What is a spacing between plant to plant and row to row ? | | | | | | |
| A | 45 × 60 cm | 101 | 91.81 | 6 | 5.54 | 7 | 6.36 |
| B | 50 × 75 cm | 95 | 86.36 | 8 | 7.27 | 3 | 2.72 |

(*contd... Table 1*)

| Sr.no. | Statement | Full | | Partial | | No | |
|---|---|---|---|---|---|---|---|
| | | F | % | F | % | F | % |
| **3.4** | Do you know about Propagation ? | 110 | 100 | - | - | - | - |
| | Season of propagation | | | | | | |
| A | Blooming | 102 | 92.72 | 5 | 4.54 | 3 | 2.72 |
| **3.5** | .how much runners are produced | | | | | | |
| A | 12-18 runners | 78 | 70.90 | 18 | 16.36 | 14 | 12.72 |
| **3.6** | . Do you know how to take Care of young seedling ? | | | | | | |
| | 1.Soil should be well supplied with | | | | | | |
| A | Moisture | 95 | 86.36 | 11 | 10 | 4 | 3.63 |
| B | Hoeing | 98 | 89.09 | 7 | 6.36 | 5 | 4.54 |
| C | Weed free | 110 | 100 | - | - | - | - |
| 4 | Integrated nutrient management | | | | | | |
| **4.1** | Application of FYM to soil helps to : | | | | | | |
| A | Increase the water holding capacity of the soil | 110 | 100 | - | - | - | - |
| B | Improve the physical properties of soil | 110 | 100 | | - | | - |
| C | Enhance microbial activity of soil | 110 | 100 | - | - | - | - |
| D | It maintains the balanced C:N ratio in the soil | 52 | 47.27 | 28 | 25.45 | 30 | 27.27 |
| E | Humic substances of FYM may act as a plant-growth stimulants | 23 | 20.90 | 48 | 43.63 | 39 | 39.09 |
| F | Any other | 31 | 28.81 | 39 | 35.45 | 40 | 36.36 |
| **4.2** | Amount of FYM/compost to be used per acre | | | | | | |
| A | 15-25 tonnes | 62 | 56.36 | 26 | 23.63 | 22 | 20 |
| **4.3** | Time of application of FYM | | | | | | |
| **A** | Before sowing | 110 | 100 | - | - | - | - |
| **B** | After sowing | 110 | 100 | - | - | - | - |
| **4.4** | Do you know the vermicompost application? | 98 | 89.09 | 12 | 10.90 | 00 | 00 |
| **A** | 5-10 t/ha vermicompost applied to field | 82 | 74.54 | 18 | 16.36 | 10 | 9.09 |
| **4.5** | Do you know green manuring crops to be grown? | | | | | | |
| A | Dhaincha | 110 | 100 | - | - | - | - |
| B | Sunhemp | 32 | 29.09 | 12 | 10.90 | 66 | 60 |
| C | Cowpea | 99 | 90 | 11 | 10 | - | - |
| **4.6** | Do you know the biofertilizer application? | | | | | | |
| A | Azotobacter | 78 | 70.90 | 12 | 10.90 | 20 | 18.18 |
| B | Rhizobium | 74 | 67.27 | 17 | 15.45 | 19 | 17.27 |
| 4.7 | Which are the advantages of mulching? | | | | | | |
| A | Reduces the evaporation rate and weeds | 110 | 100 | - | - | - | - |
| B | Reduces soil and water erosion | 110 | 100 | - | - | - | - |
| C | Encourages recycling of nutrients | 110 | 100 | - | - | - | - |
| D | Any other | - | - | - | - | 110 | 100 |
| **4.8** | Which type of mulching you practice? | | | | | | |
| B | Trash mulch | 110 | 100 | - | - | - | - |
| C | Plastic mulch | 110 | 100 | - | - | - | - |
| **4.9** | Which chemical fertilizers are generally applied to strawberry? | | | | | | |
| A | a. Straight fertilizer | 110 | 100 | - | - | - | - |
| | Urea | | | | | | |

(*contd... Table 1*)

| Sr.no. | Statement | Full | | Partial | | No | |
|---|---|---|---|---|---|---|---|
| | | F | % | F | % | F | % |
| B | b.Mix fertilizer | 110 | 110 | - | - | - | - |
| | DAP | | | | | | |
| C | c.Complex fertilizer | 110 | 110 | - | - | - | - |
| | 19:19:19 | | | | | | |
| **4.10** | Do you know Fertilizer Dose? | | | | | | |
| A | 120kgN:100kgP:75kgK/ha | 53 | 48.18 | 34 | 30.9 | 20 | 18.18 |
| **5** | Integrated Water Management | | | | | | |
| **5.1** | Do you know the different methods of irrigation? | | | | | | |
| A | Drip | 110 | 100 | - | - | - | - |
| B | Furrow | 110 | 100 | - | - | - | - |
| C | Any other | - | - | - | - | - | - |
| **5.2** | What is a pH of soil required for strawberry crop? | | | | | | |
| A | 5-6 | 33 | 30 | 64 | 58.18 | 13 | 11.81 |
| **5.3** | Do you know the time interval of irrigation? | | | | | | |
| A | Per day | 91 | 82.27 | - | - | - | - |
| B | Weekly | 19 | 17.27 | - | - | - | - |
| C | Fortnightly | - | - | - | - | - | - |
| 6 | Integrated pest management | | | | | | |
| **6.1** | Do you know the different method of weed management? | | | | | | |
| A | Cultural methods | 88 | 80 | 12 | 10.90 | 10 | 9.09 |
| B | Hand weeding | 110 | 100 | - | - | - | - |
| C | Mulching | 110 | 100 | - | - | - | - |
| D | Use of improved implements | 72 | 65.54 | 32 | 29.09 | 6 | 5.45 |
| E | Use of herbicide | 110 | 100 | - | - | - | - |
| **6.2** | Which are the majour weeds in strawberry field? | | | | | | |
| A | Ghol | 91 | 82.72 | 19 | 17.27 | - | - |
| B | Hariali | 98 | 89.09 | 12 | 10.90 | - | - |
| C | Reshim kata | 108 | 98.18 | 2 | 1..81 | - | - |
| **6.3** | Do you know the application of weedicide? | 110 | 100 | | | | |
| A | Glyphosate | 110 | 100 | - | - | - | - |
| **6.4** | Do you know the different methods of IPM tools? | | | | | | |
| A | Cultural methods | 92 | 83.63 | 18 | 16.36 | - | - |
| B | Mechanical method | 86 | 78.18 | 24 | 21.81 | - | - |
| C | Use of chemicals/pesticides | 105 | 95.45 | 5 | 4.54 | - | - |
| D | Biological method | 16 | 14.54 | 21 | 19.09 | 73 | 66.36 |
| E | Indigenous technical knowledge | 32 | 29.09 | 14 | 12.72 | 64 | 58.18 |
| **6.5** | Do you know the harmful pest of strawberry? | | | | | | |
| A | Thrips | 98 | 89.09 | 12 | 10.90 | - | - |
| B | Red mites | 110 | 100 | 00 | - | - | - |
| C | Cutworms | 62 | 56.36 | 16 | 14.54 | 32 | 29.09 |
| D | Fruit borer | 97 | 88.18 | 13 | 11.81 | - | - |

(*contd... Table 1*)

| Sr.no. | Statement | Knowledge (N=110) | | | | | |
|---|---|---|---|---|---|---|---|
| | | Full | | Partial | | No | |
| | | F | % | F | % | F | % |
| 6.6 | Do you know the application of pesticides ? | | | | | | |
| A | Thrips – Emidachloprid/Rigent | 103 | 93.63 | 7 | 6.36 | - | - |
| B | Red mites – Majester | 106 | 96.36 | 4 | 3.63 | - | - |
| C | Cutworms – before planting dusting heptachlor in soil. | 42 | 38.18 | 24 | 21.81 | 44 | 40 |
| D | Fruit borer – corazen | 92 | 83.63 | 14 | 12.72 | 6 | 5.45 |
| 6.7 | Do you know the different tools of IDM ? | | | | | | |
| A | Use of disease free seed material | 110 | 100 | - | - | - | - |
| B | Uproot and burn the disease affected plants | 32 | 29.09 | 78 | 70.90 | - | - |
| C | Biological methods | 15 | 13.63 | 23 | 20.90 | 72 | 65.45 |
| D | Use of chemicals | 110 | 100 | - | - | - | - |
| 6.8 | Do you know the diseases of strawberry ? | | | | | | |
| A | Root rot | 91 | 82.72 | 19 | 17.27 | - | - |
| B | Powdery mildew | 89 | 80.90 | 21 | 19.09 | - | - |
| C | Anthracnose | 98 | 89.09 | 12 | 10.90 | - | - |
| D | Crown rot | 86 | 78.18 | 24 | 21.81 | - | - |
| E | Leaf blight | 92 | 83.63 | 18 | 16.36 | - | - |
| 6.9 | Do you know the chemicals used for controlling diseases? | | | | | | |
| A | Root rot – curzate | 92 | 83.63 | 12 | 10.90 | 6 | 5.45 |
| B | Powdery mildew- Index | 82 | 74.54 | 21 | 19.09 | 7 | 6.36 |
| C | Anthracnose- Taqat | 86 | 78.18 | 15 | 13.63 | 9 | 8.18 |
| D | Leaf blight – curzate | 71 | 64.54 | 24 | 21.81 | 15 | 13.63 |
| 6.10 | Do you know the proper time of harvesting? | | | | | | |
| A | For local market fruit should be harvested when fully ripe | 110 | 100 | - | - | - | - |
| B | For distant market fruit should be harvested still firm and colour not fully developed. | 110 | 100 | - | - | - | - |
| 8 | What management practices should be followed after harvesting to fetch good price in market? | | | | | | |
| A | Sorting | 110 | 100 | - | - | - | - |
| B | Grading | 72 | 65.45 | 26 | 23.63 | 12 | 10.90 |
| C | Packing | 85 | 77.27 | 25 | 22.72 | - | - |
| D | Storing | 54 | 49.09 | 22 | 20 | 34 | 30.90 |

**Practice wise knowledge level of the respondents about sustainable cultivation practices.**

The information pertaining the knowledge level of strawberry growers about the sustainable cultivation practices followed in strawberry cultivation given in table 1 is discussed as under.

*Land preparation*

The table 1 revealed that majority of farmers have complete knowledge about land preparation require for sustainable cultivation of strawberry.(i.e. It helps proper establishment of crop (98.18 %),to manage pest and diseases (95.86 %), to maintain the yield stability (94.54 %), to Enhance the uptake of nutrient from deeper layer (92.72 %), to Optimizing nutrient availability (92.72 %), to Balance nutrient flow (91.81 %), to Increase infiltration rate (88.18 %), to Improved soil physical properties (83.63 %), To Reduce erosion (82.72 %), while only few percent of the respondents had partial knowledge about land

preparation require for sustainable cultivation of strawberry. (i.e. To Reduce erosion (17.27 %), to Improved soil physical properties (16.36 %),to manage pest and diseases (13.53 %), to Increase infiltration rate (11.81 %), Balance nutrient flow (8.18 %), to Optimizing nutrient availability (7.27 %), to maintain the yield stability (5.45 %) , to Enhance the uptake of nutrient from deeper layer (7.27 %). It helps proper establishment of crop (1.81 %).

It was observed that, cent per cent of the respondents had knowledge about methods of planting like flat bed and raised bed. 73.63 per cent of the respondents have complete knowledge about polyhouse which used for strawberry cultivation while 21.81 per cent and 4.54 per cent of the respondents had partial and no knowledge about polyhouse, respectively.

### Nursery

It was revealed that, 20.90 per cent of the respondents had complete knowledge about nursery management and 39.09 per cent and 40.00 per cent of the respondents had partial knowledge and no knowledge about nursery management.

### Cropping intensity

It was observed that ,the respondents had complete knowledge about strawberry rotated with legumes (65.45 %), vegetables (58.18 %), cereals (11.81 %), and all (4.54 %) for better soil fertility while the respondents had partial knowledge about strawberry rotated with cereals (69.90 %), vegetables (23.63 %), legumes (10.00 %), and all (7.27 %) and also some the respondents have no knowledge about strawberry rotated with legumes (65.45 %), vegetables (58.18 %), cereals (11.81 per cent all (4.54 %) for better soil fertility.

It was revealed that, majority of the respondents had complete knowledge about crop rotation helps to strawberry cultivation (i.e. Recycling nutrient reserves from depth in the soil (92.72 %), Reduce weeds ,pest and disease incidence (91.81 %), Increase the yield stability (80.00 %), Transfer N from N-fixing species (77.27 %), and few percent of the respondents had partial knowledge about crop rotation helps in strawberry cultivation

(i.e. Recycling nutrient reserves from depth in the soil (92.72 %), Transfer N from N-fixing species (11.81 %), Increase the yield stability (10.90 %), Reduce weeds, pest and disease incidence (3.63 %) and It was observed that there is some of the respondents had no knowledge about crop rotation helps in strawberry cultivation (i.e. Transfer N from N-fixing species (10.90 %). Increase the yield stability (9.09 %), Reduce weeds, pest and disease incidence (4.54 %) Recycling nutrient reserves from depth in the soil (2.72 %).

### Planting

It was observed from table 1 that 69.09 per cent and 75.45 per cent of strawberry growers had complete knowledge about planting distance 4 × 3 m and 4 × 4 m respectively and 12.74 per cent and 10.90 per cent the respondents had partial knowledge about planting distance 4 × 3 m and 4 × 4 m respectively. Also 18.18 per cent and 14.54 per cent of strawberry growers had no knowledge about planting distance 4 × 3 m and 4 × 4 m respectively.

It was revealed from table 1 that 91.81 per cent and 86.36 per cent of strawberry growers had complete knowledge about spacing between pant to plant and row to row 45 × 60 cm and 50 × 75 cm respectively while 5.54 per cent and 7.27 per cent of the respondents had partial knowledge about spacing between pant to plant and row to row 45 × 60 cm and 50 × 75 cm respectively While 6.36 per cent and 2.72 per cent of strawberry growers had no knowledge about spacing between pant to plant and row to row 45 × 60 cm and 50 × 75 cm respectively.

### Planting time

The data in table 1 Revealed that 75.45 per cent, 56.36 per cent and 96.36 per cent of the respondents had a complete knowledge about planting time of march-April, September-October and November-December respectively and 10 per cent, 29.09 per cent and 3.63 per cent of the respondents had a partial knowledge about planting time of March-April, September-October and November-December respectively also 14.54 per cent of the respondent had a no knowledge about planting time

of March-April and November-December respectively.

*Season of propagation*

It was observed that cent percent of the respondents had full knowledge about propagation but 92.72 per cent of the respondents had complete knowledge of season of propagation (blooming) while 4.54 per cent of had partial knowledge of season of propagation (blooming) and 2.72 per cent of the had no knowledge of season of propagation (blooming).

It was revealed that, 70.90 per cent of the respondents had complete knowledge about 12-18 runners are produced while 16.36 per cent of the respondents had partial knowledge about 12-18 runners are produced while 12.72 per cent of the respondents had complete knowledge about 12-18 runners are produced.

The result presented in table 1 shows that, majority of the respondents strawberry growers had complete knowledge about soil should be well supplied with moisture (86.36 %), hoeing (89.09 %) and cent per cent of the respondent had complete knowledge of weed free at seedling stage while 10 per cent and 6.36 per cent partial knowledge about moisture and hoeing respectively at seedling stage and 3.63 per cent and 4.54 per cent the respondents had no knowledge about soil should be well supplied with moisture and hoeing at seedling stage.

*Integrated nutrient management*

The data presented in table 1 shows that cent per cent of the respondents had knowledge about application of FYM helps in to Increase the water holding capacity of the soil and enhance microbial activity of soil. About 47.27 per cent and 20.90 per cent of the respondents had complete knowledge about maintains the balanced C:N ration in soil and Humic substance of FYM may act as plant growth stimulants respectively While 25.45 per cent and 43.63 per cent of the respondents had partial knowledge about, maintains the balanced C:N ration in soil and Humic substance of FYM may act as plant growth stimulants respectively while 39.09 per cent and 36.36 per cent of the respondents had no knowledge about maintains the balanced C:N ration

in soil and Humic substance of FYM may act as plant growth stimulants respectively.

The data presented in table 1 shows that 56.36 per cent of the respondents had complete knowledge about amount of FYM compost used (15-25 tones/acre). While 23.63 per cent of the respondents had partial knowledge about amount of FYM compost used (15-25 tones/acre). While 20.00 per cent of the respondents had no knowledge about amount of FYM compost used (15-25 tones/acre).

It was revealed that, cent per cent of the respondents had complete knowledge about application of FYM before sowing.

It was observed that majority of the respondents had complete knowledge of application of vermicompost (89.09 per cent) while 10.90 per cent of the respondents had partial knowledge of application of vermicompost. About 74.54 per cent of the respondents had complete knowledge 5-10 tones/ha Vermicompost applied to field while 16.36 per cent of the respondents had partial knowledge 5-10 tones/ha vermicompost applied to field and 9.09 per cent of the respondents had no knowledge of 5-10 tones/ha vermicompost applied to field

It was revealed that, cent percent of the respondents had complete knowledge about green manuring crops like Dhaincha, sunhemp and cowpea.

The data presented in table 12 shows that 70.90 per cent and 67.27 per cent of the respondents had complete knowledge about biofertilizer application like azotobacter and rhizobium respectively while 10.90 per cent and 15.45 per cent of the respondents had partial knowledge about biofertilizer application like azotobacter and rhizobium respectively while 18.18 per cent and 17.27 per cent of the respondents had no knowledge about biofertilizer application like azotobacter and rhizobium respectively.

*Mulching*

It was revealed that, cent per cent of the respondents had complete knowledge about advantages of mulching (Reduces the evaporation rate and weeds, Reduces soil and water erosion, Encourages

recycling of nutrient) cent percent of the respondents had complete knowledge about plastic and trash mulch

### Chemical fertilizers

The present data reveals that, cent percent of strawberry growers had complete knowledge about straight fertilizers (urea), Mix fertilizers (DAP), complex fertilizers (19:19:19) but near about fifty per cent of the respondents (48.18 %) had complete knowledge about fertilizer dose of strawberry while 30.90 per cent and 18.18 per cent the respondents had partial and no knowledge about fertilizer respectively.

### Integrated water management

Cent per cent of the respondents had complete knowledge about method of irrigation like drip and furrow.

It was revealed that, only 30.00 per cent of the respondents have complete knowledge about pH of soil while 58.18 per cent and 11.81 per cent the respondents had partial and no knowledge about pH of soil (5-6) respectively.

It was revealed that, Majority of the respondents have complete knowledge about time interval of irrigation i.e. per day (82.27 %) ,and weekly (17.27 %).

### Integrated pest management

#### Weed management

It was observed that, Majority of the respondents (80.00 %) had complete knowledge about cultural method of weed management while 10.90 per cent and 9.09 per cent of the respondents had partial and no knowledge about cultural method of weed management respectively.

Majority of the respondents had complete knowledge about major weeds on strawberry field i.e. ghol (82.72 %) , Hariali (89.09 %) and Reshim Kata (98.18 %) while some the respondents had partial knowledge about major weeds in strawberry field i.e. ghol (17.27 %), hariali (10.90 %) and Reshim kata (1.81 %).

Cent per cent of the respondents had complete knowledge about application of weedicide (glyphosate).

### Integrated pest management

It was revealed that 83.63 per cent of the respondents had complete knowledge about cultural method of pest management followed by 78.18 per cent of the respondent had complete knowledge about mechanical method of pest management and majority of the respondent (95.36 %) had complete knowledge about chemicals used for pest control and some the respondents had partial knowledge about cultural method (16.36 %), mechanical method (21.81 %) and use of chemicals (4.54 %) for pest management.

It was observed that, majority of the respondents had complete knowledge about chemical used in controlling pests i.e. red mites-majester (96.36 %), thrips-emidachloprid/regent (93.63 %), and fruit borer-corazen (83.63 %), and cutworms-before planting dusting heptachlor in soil (38.18 %) While some the respondents had partial knowledge of chemicals used in controlling pests i.e cutworms-before planting dusting heptachlor in soil (21.81 %), fruit borer-corazen (12.72 %), thrips-emidachloprid/regent (6.36 %), and red mites-majester (3.36) and few the respondents had no knowledge about chemicals used in controlling pests i.e. cutworms-before planting dusting heptachlor in soil (40.00 %) and fruit borer-corazen (5.45 %).

It was revealed that, more than fifty per cent of the respondents (56.36 %) had complete knowledge about biological method of pest management while 29.09 per cent and 14.54 per cent the respondents had partial and no knowledge about biological method of pest management, respectively. About 29.09 per cent of the respondents had their complete indigenous knowledge while 12.72 per cent and 58.18 per cent the respondents had their partial and no indigenous knowledge about management of pest respectively.

Majority of the respondents had complete knowledge about major pest in strawberry field i.e. thrips (89.09 %) ,red mites (cent percent) and fruit borer (88.18 %) while some the respondents had

partial knowledge about major pest in strawberry field i.e. thrips (10.90 %), fruit borer (11.81 %). More than fifty per cent of the respondents had complete knowledge about cutworms (56.36 %) while 14.54 per cent and 29.09 per cent had partial and no knowledge about cutworms.

### Integrated disease management

It was observed that, cent percent respondents had complete knowledge about different tools of integrated disease management (i.e. use disease free seed material and use of chemicals) while more than half of the respondents (56.60 %) had complete knowledge about biological method of disease management while 29.09 per cent and 14.54 per cent the respondents had partial and no knowledge about biological method of disease management, respectively.

It was revealed that, only 29.09 per cent of the respondents had complete knowledge about uproot the affected plants and burn it while 70.90 per cent of the respondents had partial knowledge about uproot the affected plants and burn it.

Majority of the respondents had complete knowledge about major diseases in strawberry field i.e. anthracnose (89.09 %), leaf blight (83.63 %) root rot (82.72 %), powdery mildew (80.90 %), while some the respondents had partial knowledge about major diseases in strawberry field i.e. powdery mildew (19.09 %), root rot (17.27 %), leaf blight ( 16.36 %) and anthracnose (10.90 %).

It was observed that, majority of the respondents had complete knowledge about chemicals used in controlling diseases i.e. root rot – curzate (83.63 %), powdery mildew-index (74.54 %), Antracnose-Taqat (78.18 %) and leaf blight – curzate (64.54 %). While some the respondents had partial knowledge about chemicals used in controlling diseases i.e. root rot – curzate (83.63 %), Antracnose-Taqat (78.18 %) powdery mildew-index (74.54 %) and leaf blight – curzate (64.54 %) and few of the respondents had no knowledge about chemicals used in controlling diseases i.e. leaf blight – curzate (13.63 %) Antracnose-Taqat (8.18 %) ,powdery mildew-index (6.36 %) and root rot – curzate (5.45 %).

### Proper time of harvesting

It was revealed that cent percent the respondents had complete knowledge about proper time of harvesting i.e. for local market fruit should be harvested when fully ripe and for distant market fruit should be harvested still firm and colour not fully developed.

### Management after harvesting

#### 13.1. Sorting

It was observed that, cent percent of the respondents had complete knowledge about sorting.

#### Grading

Present data reveals that ,near about two third of the respondents (65.45 %) had complete knowledge about grading while 23.63 per cent and 10.09 per cent of the respondents had partial and no knowledge about grading, respectively.

#### Packing

It was observed that, 77.27 per cent of the respondents had complete knowledge about packing while 22.72 per cent of the respondents had partial knowledge about packing.

#### Storing

Present data reveals that, 49.09 per cent of the respondents had complete knowledge about grading while 20.00 per cent and 30.90 per cent of the respondents had partial and no knowledge about storing, respectively.

### CONCLUSION

It was revealed that, majority of respondents had complete knowledge about land preparation while cent percent of respondent had complete knowledge about ploughing the land by using bullock power, by using tractor/power tiller and method of planting (flat bed and raised bed). More than two third of the respondents had complete knowledge about polyhouse used for planting but about more than on third respondents had no knowledge about nursery management.

Near about two third of the respondents had complete knowledge about strawberry rotated with legumes. Majority of respondents had complete knowledge about importance crop rotation. Only one fourth of the respondents had no knowledge about spacing of raised beds (4 × 4 m). Majority of respondents had proper knowledge about planting time of strawberry (November-December). Majority of respondents had complete knowledge about plant to plant and row to row spacing (45 × 60 m and 50 × 75 m). Cent per cent of respondents had complete knowledge about propagation and 92.72 majority of the respondents had knowledge about season of propagation. Majority of respondents had complete knowledge about soil should be supplied with moisture, hoeing and weed free. Cent percent of respondents had complete knowledge importance of application of FYM to soil and time of application. Majority of respondents had complete knowledge about vermicompost application and their dose. Cent percent of respondents had knowledge about green manuring (Dhaincha). Two third cent the respondents had complete knowledge about biofertilizer application (Azotobacter and Rhizobium). Cent percent of respondents had complete knowledge about advantages of mulching (trash mulch and plastic mulch). Cent percent of respondents had complete knowledge about fertilizers generally applied to field. Near about half of respondents had complete knowledge about dose of fertilizer used in strawberry field. .

Cent percent of respondents had complete knowledge about different methods of irrigation (Drip, Furrow). More than one fourth of respondents had knowledge about pH of soil required for strawberry crop. Majority of the respondents had complete knowledge about time interval of irrigation (per day). Majority of respondents complete knowledge about integrated weed management and major weeds of strawberry field. Majority of respondents complete knowledge about integrated pest management and major pest of strawberry field. More than 80.00 per cent respondents had complete knowledge about application of pesticides. Majority of respondents complete knowledge about integrated disease management and major diseases of strawberry field. Cent percent of respondents complete knowledge about proper time of harvesting. Cent percent of respondents had complete knowledge about post harvesting practices like storing and about one fourth of the respondents had no knowledge about storing.

## *References*

Ghadge, S.N. (2005), " knowledge and adoption of recommended practices for control for oily spot disease on pomegranate in solapur district". M.Sc. (Agri) thesis. (unpublished) Mahatma Phule Krishi Vidyapeeth, Rahuri.

Howal, A. (2008), Study of Technological gap in pomegranate growers.Msc. Agri Thesis. (unpublished) Mahatma Phule Krishi Vidyapeeth, Rahuri

Kharat, B. S. (2013), Use of information sources by pomegranate growers. M.Sc. (Agri) Thesis. (unpublished) mahatma Phule Krishi Vidyapeeth, Rahuri.

Patil (2008), A study on constraints analysis of grape exporting farmers of Maharashtra state. Ph.D. thesis. University of Agricultural sciences, Dharwad.

Raut P. M. (2006), Production constraints of orange cultivation in Nagpur district of Maharashtra. Asian journal of Extension Education xxv: 1-4.

Sonawane, H. P. (1996), A study of profile strawberry growers of Mahabaleshwar tahsil, M.Sc. (Agri) Thesis. (unpublished) Mahatma Phule Krishi Vidyapeeth, Rahuri.