



Assessment of Thematic Areas for Training Needs of Apple Growers in Shopian of Jammu and Kashmir Districts, India

Zahoor Ahmad Shah^{1*}, Rekhi Singh², Rufaida Mir¹, Jehangir Muzaffar Matoo¹ and Mushtaq Ahmad Dar³

¹Research Scholar, Division of Agricultural Extension and Communication, SKUAST-K, India.

²Krishi Vigyan Kendra, Srinagar, India.

³Division of Agricultural Extension and Communication, SKUAST-K, India.

Authors' contributions

This work was carried out in collaboration between all authors. Author ZAS designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author RS was the guide during the whole study, designed and performed the statistical analysis and their interpretation. Author RM managed the analyses of the study. Author JMM managed the literature searches and author MAD finalized the design, protocol and checked the draft report. All authors read and approved the final manuscript.

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ABSTRACT

Nature has endowed the state of Jammu and Kashmir (India) with wide range of agro-climatic conditions which permits the production of varieties of temperate fruits. The district Shopian was purposively selected, because of potentiality for the development of horticulture, mainly because 90 percent area of the district was under apple plantation. The study was conducted in different altitudes and major training need components identified for the study were crop production, plant protection, harvesting and marketing etc. It was observed that integrated disease management

*Corresponding author: E-mail: s.zahoor37@gmail.com

received highest score in all the three altitudes under study, and was the most prioritized thematic area for training needs. Soil and water testing received first priority in mid and high altitude areas while it got second level of priority in low altitude areas. The training needs for micro irrigation system in orchards were given lowest priority by the fruit growers in all the three altitudes.

Keywords: Altitude; apple growers; thematic areas; training needs.

1. INTRODUCTION

Agriculture is the back bone of the Indian economy and plays a vital role in the overall development of the nation [1]. India has achieved self-sufficiency in food grain production and now the major concern is to achieve higher growth rate. The focus has now shifted from agriculture to horticulture sector, which besides imparting nutritional security, offers a great potential for efficient input use, higher returns per unit area, crop diversification, foreign exchange earnings and greater employment generation through post-harvest processing in agro industries. Fruit cultivation in India is one such potential commercial and business sectors for exporting merchandise and shipping from which much of the international revenue is expected [2]. Millions of farmers rely on land, which is too small and too poor to sustain the living of their families, but still they have to make ends meet on that land. Indian agriculture is facing serious challenges because of its ever-increasing population, limited land and water availability, and degradation of natural resources. It is desirable to increase agricultural productivity in a sustainable manner. The excessive use of agro-chemicals over past decades has deteriorated soil health leading to declines of crop yields and produce quality [3].

Apple is commercially the most important temperate fruit and occupies the fourth (4th) position in the world in terms of production after banana, orange and grapes. China, USA and Turkey are the top three countries in the world as for as apple production is concerned, followed by Italy, India and Poland [4]. Indian apple production averaged nearly 1.4 million making it the sixth largest apple producer in the world. Apple alone is the fourth widely produced fruit in the world after Banana, Orange and grapes. India Annually exports apple worth of Rs 400 million (Nearly US \$ 10 million) out of which Rs 200 million of apples comes from Jammu and Kashmir's Northern region (Kashmir) and provides job opportunity to 1.2 million people directly, or indirectly. Its area is estimated to be the second largest in the world and in Asia it is the second largest producer. There-by making it the largest contributor to the State GDP [5].

Nature has endowed the state of Jammu and Kashmir with wide range of agro- climatic conditions which permit the production of varieties of temperate fruits. It has varied climatic features, topography and diversity in physiographic features, existence of cold arid, temperate, intermediate and sub-tropical zones within a small geographical area. Though the large diversity in agro-climatic conditions of the state is conducive for propagation of diversified farming system, the terrain at the same time is tough and accessibility to a greater part of the region is poor. This causes the lot of hurdles to the inhabitants regarding the knowledge and awareness about the use of inputs, products and other farming practices.

There are also certain factors such as alternate bearing, defective pruning and training, use of seedling rootstock of unknown performance, lack of proper nutrient and water management, deficiency of suitable pollinizers/pollinators and ineffective control of pests and diseases which are responsible for low productivity and quality.

Since scanty studies have undertaken so far, related to the assessment of training needs, which have tried to determine the cause for such low productivity and quality of apple in Kashmir. Keeping in view the importance and need of trainings to the farming community in general and apple growers in particular, it clamored the researcher to undertake the present study entitled "Assessment of Thematic Areas for Training Needs of Apple Growers in Shopian of Jammu and Kashmir Districts, India"

Training of the farmers is essential to induce motivation, create confidence and inculcate efficiency in an individual [6]. Training of the farmers is also inevitable for imparting new knowledge and updating the skills of farmers. Training of farmers had assumed further importance and urgency in the context of the high yielding varieties and improved practices in agriculture and allied fields. In order to make any training meaningful and effective, it is imperative on the part of the training organizers to identify the training needs of the farmers based on which

suitable training modules can be developed so that the appropriate training is given to the right people, in the right form, at the right time so that higher degree of productivity and profitability can be achieved [7]. Therefore, training of the farmers is 'an intensive learning activity, assisted by competent trainers to understand and practice the skills required in a deficit situation in the knowledge, skills and attitude level of the practicing farmers as well as the availability of appropriate applicable information, the utilization of which will correct the problems [8].

Training is a process of acquisition of new skills, attitude and knowledge in the context of preparing for entry into a vocation or improving ones productivity in an enterprise. Effective training requires a clear picture of how the trainees or farmers will need to use information after training in place of local practices what they have adopted before in their situation. Training of the farmers is carried out so as to be fitted, qualified and proficient. The purpose is to impact knowledge and skills to the farmers so that they can perform some desirable tasks [9]. Training of farmers focused on enterprise skills, such as market analysis, distribution and business management, would support small-scale farmers in identifying the technologies that would benefit them most, and would help them to participate in agricultural innovation [10]. Training of farmers largely consists of well-organized opportunities for participants to acquire necessary understanding and skill. Farmer training is directed towards improving their job efficiency in farming. The kind of education we call as training is not for knowing more but behaving differently [11].

A Training Needs Assessment is a systematic process for determining and addressing "needs" or "gaps" between the current conditions and desired conditions or "wants". The discrepancy between the current condition and wanted condition must be measured to appropriately identify the need. The need can be desired to improve current performance or to correct a deficiency. The purpose of the training needs assessment is to identify performance requirements and the knowledge, skills, and abilities needed by an individual to achieve the requirements. An effective training needs assessment may help direct resources to areas of greatest demand. The assessment should address resources needed to improve productivity and quality.

2. RESEARCH METHODOLOGY

The present study was conducted in the state of Jammu and Kashmir (India) comprising extreme sector of Himalaya's and occupies a central geographical location in the Asian continent. A multistage sampling procedure was adopted for the selection of districts, tehsils, villages and sample respondents. Kashmir valley consists of 10 districts namely Anantnag, Kulgam, Pulwama, Shopian, Srinagar, Bandipora, Baramulla, Budgam, Ganderbal and Kupwara. Among these, district Shopian was selected purposively. District Shopian was purposively selected because of the potentiality for the development of horticulture, mainly because 90 percent area of the district was under apple plantation and prevailing agro-climatic situations were very good for cultivation of horticultural crops especially fruit crops and apple in particular. The study was conducted in three types of altitudes viz. high altitude, mid altitude and low altitude in the form of strata which were purposively selected. Each strata consisted of three villages which were randomly selected. A list of apple growers from each village was prepared in consultation with village sarpanches/revenue authorities. The prepared list was stratified properly, taking care that it includes small, marginal and large farmers. Accordingly a sample size of twenty farmers from each village was selected randomly, thus making a sample size of sixty respondents from each strata based on the total number of respondents engaged in apple cultivation. A sample size of 180 respondents from all the three strata's was included in the study. Data collection from randomly selected respondents was made by using pre-tested 'structured schedule' through personal interview method. For this purpose, an interview schedule was constructed for data collection from respondents in the light of the objective of the study. The selected respondents were personally interviewed at their place of residence/ fields and the responses were recorded in the schedule. In the present study, training needs of apple growers was taken as dependent variable and other such as age, education, family education, experience, innovative proneness, media exposure etc. as independent variables and analysis of data was done between dependent and independent variables. Utmost care was taken to make the respondents to understand the objective of the study and clarified their doubts in the interview schedule. For the present study, a list of 30 major components/ thematic areas was prepared. In this regard, the farmers were

requested to give a “tick” in one of the three response categories (viz. Very Important, Important and Not Important) provided against the identified specific items under each major component based on their perceived needs for providing training to them for further improvement in their farming system and livelihood. The major training needs components identified for the study were crop production, plant protection, Harvesting and marketing etc. The farmer’s responses were collected in a 3-point continuum scale viz. Very Important (VI), Important (I) and Not Important (NI) by assigning scores 3, 2 and 1 respectively.

| Option (Response category) | Score |
|----------------------------|-------|
| Very Important (VI) | 3 |
| Important (I) | 2 |
| Not Important (NI) | 1 |

The results were calculated as weighted score for each of the thematic area identified for the training needs:

$$W.S = \frac{No\ of\ V.I \times 3 + No\ of\ I \times 2 + No\ of\ N.I \times 1}{Total\ No.\ V.I + I + N.I}$$

Where:

- W.S= weighted score
- V.I= Very Important
- I= Important
- N.I= Not Important [12].

3. RESULTS AND DISCUSSION

3.1 Thematic Areas for Training Needs of Apple Growers in Low Altitude Areas

The data presented in Table 1 reveals the thematic areas for training needs of apple growers. Among the thematic areas it is evident from the data that in low altitude areas, integrated disease management got rank I on the basis of weighted score (2.66), followed by soil and water testing, and training and pruning each of them got rank II and weighted score of 2.61, integrated pest management, improvement in production and quality, pollination, marketing and pre-harvest fruit drop each got rank III and weighted score of 2.55 each, the thematic areas such as management of inorganic fertilizers, integrated nutrient management and nursery raising got rank IV and weighted score 2.53 each, rejuvenation of unproductive orchards, management of young plants/orchards, proper

grading and packaging technique each of them got rank V and weighted score 2.48, plant propagation techniques and management of physiological disorders got rank VI and weighted score 2.40, harvesting, not to use chemicals for colouring of apple crop, bio-control of pests and diseases, soil and water conservation each of them got rank VII and weighted score 2.31, in the same manner thinning of flowers, micro-nutrient deficiency in crops, using hand gloves and masks while spraying all of them got rank VIII and weighted score of 2.21, preparation of orchard layout, selection of site for orchard each got rank IX and weighted score 2.15, nursery management, planting of apple saplings got rank X and weighted score 2.13, proper cleaning of spraying machinery after each spray, disposal of pesticide and insecticide containers got rank XI and weighted score 1.93 and among the thematic areas in lower altitude areas micro-irrigation system of orchards got the lowest weighted score of 1.75, hence lowest rank of XII. It has been revealed from the data that most of the farmers need immediate trainings in Integrated Disease Management, Soil and water testing, training and pruning etc. which are the main components where farmers face difficulty.

3.2 Thematic Areas for Training Needs of Apple Growers in Mid Altitude Areas

The data presented in Table 2 reveals that in middle altitude areas soil and water testing, integrated disease management, training and pruning, integrated pest management each of them got rank I on the basis of weighted score (2.61), followed by improvement in production and quality, pre-harvest fruit drop, each of them got rank II and weighted score of 2.56, marketing, proper grading and packaging techniques and pollination, each of them got rank III and weighted score of 2.53, followed by management of inorganic fertilizers, and rejuvenation of unproductive orchards each of them got rank IV and weighted score of 2.51, the thematic areas such as integrated nutrient management, bio-control of pests and diseases, harvesting, plant propagation techniques, management of young plants/orchards, thinning of flowers, micro nutrient deficiency in crops got rank V and weighted score of 2.45 each, management of physiological disorders, selection of site for orchard, not to use chemicals for colouring of apple crop, preparation of orchard layout and nursery raising each of them got rank VI and weighted score of 2.30, nursery management,

Table 1. Thematic areas for training needs of apple growers in low altitude areas

| S. no. | Thematic areas | V. I training needs | I training needs | N.I training needs | W.S | Rank |
|--------|--|---------------------------|------------------------|--------------------------|------|------|
| 1. | Integrated Disease Management. | 46 | 8 | 6 | 2.66 | I |
| 2. | Soil and water testing. | 44 | 9 | 7 | 2.61 | II |
| 3. | Training and pruning. | 42 | 13 | 5 | 2.61 | II |
| 4. | Integrated Pest Management. | 42 | 9 | 9 | 2.55 | III |
| 5. | Improvement in production and quality. | 41 | 11 | 8 | 2.55 | III |
| 6. | Pollination. | 38 | 17 | 5 | 2.55 | III |
| 7. | Marketing. | 40 | 13 | 07 | 2.55 | III |
| 8. | Pre harvest fruit drop. | 37 | 19 | 04 | 2.55 | III |
| 9. | Management of Inorganic fertilizers. | 39 | 14 | 07 | 2.53 | IV |
| 10. | Integrated nutrient Management. | 37 | 18 | 05 | 2.53 | IV |
| 11. | Nursery raising | 38 | 16 | 06 | 2.53 | IV |
| 12. | Rejuvenation of unproductive orchards. | 37 | 15 | 8 | 2.48 | V |
| 13. | Management of young plants/orchards. | 36 | 17 | 07 | 2.48 | V |
| 14. | Proper grading and packaging technique. | 35 | 19 | 06 | 2.48 | V |
| 15. | Plant propagation techniques. | 37 | 11 | 12 | 2.40 | VI |
| 16. | Management of Physiological Disorders. | 36 | 13 | 11 | 2.40 | VI |
| 17. | Harvesting. | 29 | 21 | 10 | 2.31 | VII |
| 18. | Not to use chemicals for colouring of apple crop. | 31 | 15 | 15 | 2.31 | VII |
| 19. | Bio-control of pests and diseases. | 32 | 15 | 13 | 2.31 | VII |
| 20. | Soil and Water conservation. | 31 | 17 | 12 | 2.31 | VII |
| 21. | Thinning of flowers. | 26 | 21 | 13 | 2.21 | VIII |
| 22. | Micro-nutrient deficiency in crops. | 25 | 23 | 12 | 2.21 | VIII |
| 23. | Using hand gloves and masks while spraying. | 21 | 31 | 8 | 2.21 | VIII |
| 24. | Preparation of orchard layout. | 21 | 27 | 12 | 2.15 | IX |
| 25. | Selection of site for orchard. | 24 | 21 | 15 | 2.15 | IX |
| 26. | Nursery Management. | 21 | 26 | 13 | 2.13 | X |
| 27. | Planting of apple saplings. | 18 | 32 | 10 | 2.13 | X |
| 28. | Proper cleaning of spraying machinery after each spray. | 17 | 22 | 21 | 1.93 | XI |
| 29. | Disposal of pesticide and insecticide containers properly. | 13 | 30 | 17 | 1.93 | XI |
| 30. | Micro-irrigation system of orchards. | 8 | 29 | 23 | 1.75 | XII |

V.I=Very Important, I=Important, N.T=Not Important, W.S=Weighted Score

soil and water conservation, planting of apple saplings, proper cleaning of spraying machinery each of them got rank VII and weighted score 2.15, using hand gloves and masks while spraying, micro irrigation system of orchards, disposal of pesticide and insecticide containers each of them got lowest rank VIII and weighted score 1.93.

3.3 Thematic Areas for Training Needs of Apple Growers in High Altitude Areas

The data presented in Table 3 reveals that in high altitude areas soil and water testing, marketing, integrated disease management, integrated pest management each of them got

rank I on the basis of weighted score (2.70), followed by training and pruning, improvement in production and quality both of them got weighted score of 2.65 and hence rank II, proper grading and packaging techniques, management of inorganic fertilizers and pollination, pre-harvest fruit drop and rejuvenation of unproductive orchards each of them got rank III and weighted score of 2.61, plant propagation techniques, integrated nutrient management, bio-control of pests and diseases each of them got rank IV and weighted score of 2.55, the thematic areas such, management of physiological disorders, thinning of flowers, management of young plants/orchards each of them got rank V and weighted score of 2.51, micro-nutrient deficiency

in crops and harvesting both of them got rank VI and weighted score of 2.35, soil and water conservation, and using hand gloves and masks while spraying both of them got rank VII and weighted score 2.28, nursery management, nursery raising, not to use chemicals for colouring of apple crop, preparation of orchard layout all of them got rank VIII and weighted score of 2.25, planting of apple saplings, selection of site for orchard, proper cleaning of spraying machinery each of them got rank IX and weighted score of 2.18, disposal of pesticide and insecticide containers, micro irrigation system of orchards, each of them got lowest rank X and weighted score of 2.01.

3.4 Rank Wise Comparison of Training Needs of Farmers for the Selected Altitude

The data presented in Table 4 reveals that in all the three altitudes integrated disease management got rank I, so it indicates that farmers need trainings on priority basis in disease management, while as in lower altitude training and pruning, soil and water testing both of them got rank II while as soil and water testing got rank I in mid and high altitude, and training and pruning got rank I in mid and rank II in high altitude. In case of lower altitude integrated pest management got rank III, while it got rank I in mid

Table 2. Thematic areas for training needs of apple growers in mid altitude areas

| S. no. | Thematic areas | V. I training needs | I training needs | N.I training needs | W.S | Rank |
|--------|--|---------------------------|------------------------|--------------------------|------|------|
| 1. | Soil and water testing. | 41 | 15 | 4 | 2.61 | I |
| 2. | Integrated Disease Management. | 40 | 17 | 4 | 2.61 | I |
| 3. | Training and pruning. | 43 | 11 | 6 | 2.61 | I |
| 4. | Integrated Pest Management. | 42 | 12 | 6 | 2.61 | I |
| 5. | Improvement in production and quality. | 41 | 12 | 7 | 2.56 | II |
| 6. | Pre harvest fruit drop. | 40 | 14 | 6 | 2.56 | II |
| 7. | Marketing. | 39 | 14 | 7 | 2.53 | III |
| 8. | Proper grading and packaging technique. | 42 | 8 | 10 | 2.53 | III |
| 9. | Pollination. | 43 | 6 | 11 | 2.53 | III |
| 10. | Management of Inorganic fertilizers. | 37 | 17 | 6 | 2.51 | IV |
| 11. | Rejuvenation of unproductive orchards. | 36 | 19 | 05 | 2.51 | IV |
| 12. | Integrated nutrient Management. | 33 | 21 | 06 | 2.45 | V |
| 13. | Bio-control of pests and diseases. | 35 | 17 | 8 | 2.45 | V |
| 14. | Harvesting. | 34 | 19 | 7 | 2.45 | V |
| 15. | Plant propagation techniques. | 37 | 13 | 10 | 2.45 | V |
| 16. | Management of young plants/orchards. | 38 | 11 | 11 | 2.45 | V |
| 17. | Thinning of flowers. | 32 | 23 | 5 | 2.45 | V |
| 18. | Micro nutrient deficiency in crops. | 37 | 13 | 10 | 2.45 | V |
| 19. | Management of Physiological Disorders. | 31 | 16 | 13 | 2.30 | VI |
| 20. | Selection of site for orchard. | 26 | 26 | 8 | 2.30 | VI |
| 21. | Not to use chemicals for colouring of apple crop. | 32 | 14 | 14 | 2.30 | VI |
| 22. | Preparation of orchard layout. | 27 | 24 | 9 | 2.30 | VI |
| 23. | Nursery raising. | 33 | 12 | 15 | 2.30 | VI |
| 24. | Nursery Management. | 22 | 25 | 13 | 2.15 | VII |
| 25. | Soil and Water conservation. | 21 | 27 | 12 | 2.15 | VII |
| 26. | Planting of apple saplings. | 23 | 23 | 14 | 2.15 | VII |
| 27. | Proper cleaning of spraying machinery after each spray. | 19 | 31 | 10 | 2.15 | VII |
| 28. | Using hand gloves and masks while spraying. | 17 | 22 | 21 | 1.93 | VIII |
| 29. | Micro Irrigation system of orchards. | 16 | 24 | 20 | 1.93 | VIII |
| 30. | Disposal of pesticide and insecticide containers properly. | 14 | 28 | 18 | 1.93 | VIII |

V.I=Very Important, I=Important, N.T=Not Important, W.S=Weighted Score

Table 3. Thematic areas for training needs of apple growers in high altitude areas

| S. no. | Thematic areas | V. I training needs | I training needs | N.I training needs | W.S | Rank |
|--------|--|---------------------------|------------------------|--------------------------|------|------|
| 1. | Soil and water testing. | 43 | 16 | 1 | 2.70 | I |
| 2. | Marketing. | 44 | 14 | 2 | 2.70 | I |
| 3. | Integrated Disease Management. | 46 | 10 | 4 | 2.70 | I |
| 4. | Integrated Pest Management. | 47 | 8 | 5 | 2.70 | I |
| 5. | Training and pruning. | 46 | 7 | 7 | 2.65 | II |
| 6. | Improvement in production and quality. | 43 | 13 | 4 | 2.65 | II |
| 7. | Proper grading and packaging technique. | 41 | 15 | 4 | 2.61 | III |
| 8. | Management of Inorganic fertilizers. | 43 | 11 | 6 | 2.61 | III |
| 9. | Pollination. | 44 | 09 | 7 | 2.61 | III |
| 10. | Pre harvest fruit drop. | 41 | 15 | 4 | 2.61 | III |
| 11. | Rejuvenation of unproductive orchards. | 42 | 13 | 5 | 2.61 | III |
| 12. | Plant propagation techniques. | 41 | 11 | 8 | 2.55 | IV |
| 13. | Integrated nutrient Management | 40 | 13 | 7 | 2.55 | IV |
| 14. | Bio-control of pests and diseases. | 37 | 19 | 4 | 2.55 | IV |
| 15. | Management of Physiological Disorders. | 34 | 21 | 5 | 2.51 | V |
| 16. | Thinning of flowers. | 33 | 25 | 2 | 2.51 | V |
| 17. | Management of young plants/orchards. | 37 | 17 | 6 | 2.51 | V |
| 18. | Micro nutrient deficiency in crops. | 31 | 19 | 10 | 2.35 | VI |
| 19. | Harvesting. | 35 | 11 | 14 | 2.35 | VI |
| 20. | Soil and Water conservation. | 26 | 25 | 9 | 2.28 | VII |
| 21. | Using hand gloves and masks while spraying. | 25 | 27 | 8 | 2.28 | VII |
| 22. | Nursery Management. | 27 | 21 | 12 | 2.25 | VIII |
| 23. | Nursery raising. | 24 | 27 | 09 | 2.25 | VIII |
| 24. | Not to use chemicals for colouring of apple crop. | 28 | 19 | 13 | 2.25 | VIII |
| 25. | Preparation of orchard layout. | 22 | 31 | 7 | 2.25 | VIII |
| 26. | Planting of apple saplings. | 25 | 21 | 14 | 2.18 | IX |
| 27. | Selection of site for orchard. | 22 | 27 | 11 | 2.18 | IX |
| 28. | Proper cleaning of spraying machinery after each spray. | 19 | 33 | 8 | 2.18 | IX |
| 29. | Disposal of pesticide and insecticide containers properly. | 21 | 19 | 20 | 2.01 | X |
| 30. | Micro Irrigation system of orchards. | 19 | 23 | 18 | 2.01 | X |

V.I=Very Important, I=Important, N.T=Not Important, W.S=Weighted Score

and high altitude, Improvement in production and quality were ranked III in low altitude and II in mid and high altitude, pre harvest fruit drop got rank III in low and high altitude and II in mid altitude, while as marketing got rank III in low and mid altitude and I in high altitude. In all the three altitudes pollination got rank III, while as management of inorganic fertilizers got rank IV in low and mid altitude and rank III in high altitude areas. Proper grading and packaging technique got rank V in lower altitude, while it got rank III in mid and high altitude. Integrates nutrient management got rank IV in low and high altitudes, while it got rank V in mid altitude areas.

Plant propagation techniques got rank V in mid altitude and rank VI in low altitude areas and rank IV in high altitude areas. Bio control of pests and diseases got rank IV in high altitudes, rank V in mid attitude, and rank VII in lower altitude. In the same way micro irrigation system of orchards got lowest rank in all the three altitude areas. The highest rank of the components indicate that farmers need immediate training in that particular component and lack of knowledge and training could be the reason of low production and productivity of the apple produce, whereas low rank of the component indicates less training needs.

Table 4. Rank wise comparison of training needs of farmers for the selected altitude

| S. no. | Thematic areas | Altitude | | |
|--------|--|----------|------|------|
| | | Low | Mid | High |
| 1. | Integrated Disease Management. | I | I | I |
| 2. | Soil and water testing. | II | I | I |
| 3. | Training and pruning. | II | I | II |
| 4. | Integrated Pest Management. | III | I | I |
| 5. | Improvement in production and quality. | III | II | II |
| 6. | Pre harvest fruit drop. | III | II | III |
| 7. | Marketing. | III | III | I |
| 8. | Pollination. | III | III | III |
| 9. | Management of Inorganic fertilizers. | IV | IV | III |
| 10. | Proper grading and packaging techniques. | V | III | III |
| 11. | Rejuvenation of unproductive orchards. | V | IV | III |
| 12. | Integrated nutrient Management. | IV | V | IV |
| 13. | Bio-control of pests and diseases. | VII | V | IV |
| 14. | Harvesting. | VII | V | VI |
| 15. | Plant propagation techniques. | VI | V | IV |
| 16. | Management of young plants/orchards. | V | V | V |
| 17. | Thinning. | VIII | V | V |
| 18. | Micro nutrient deficiency in crops. | VIII | V | VI |
| 19. | Management of Physiological Disorders. | VI | VI | V |
| 20. | Selection of site for orchard. | IX | VI | IX |
| 21. | Not to use chemicals for colouring of apple crop. | VII | VI | VIII |
| 22. | Preparation of orchard layout. | IX | VI | VIII |
| 23. | Nursery raising. | IV | VI | VIII |
| 24. | Nursery Management. | X | VII | VIII |
| 25. | Soil and Water conservation. | VII | VII | VII |
| 26. | Planting of apple saplings. | X | VII | IX |
| 27. | Proper cleaning of spraying machinery after each spray. | XI | VII | IX |
| 28. | Using hand gloves and masks while spraying. | VIII | VIII | VII |
| 29. | Micro Irrigation system of orchards. | XII | VIII | X |
| 30. | Disposal of pesticide and insecticide containers properly. | XI | VIII | X |

V.I=Very Important, I=Important, N.T=Not Important, W.S=Weighted Score

It was seen that majority of the farmers needed training in soil testing, expert guidance, layout planning and pollination in planning skills, pest and disease management, nutritional management and physiological disorder management in management skills and in proper weighing of chemicals for spray, handling of spray equipment's, grading and packaging in practical skills on priority basis. Moreover apple growers had delineated different thematic areas wherever they need trainings, these include integrated disease management which got maximum weighted score as per the response of the apple growers in all the three altitudes, followed by soil and water testing, training and pruning, integrated pest management etc. These findings were in line with the findings of [13].

4. CONCLUSION

More emphasis should be given on practical trainings instead of lectures and apple growers should be encouraged to learning by doing. In order to achieve stability in apple production, the resources should be fully exploited by encouraging farmers by providing them with the necessary support services, with necessary arrangement of credit and subsidies as and when required. Individual members of the families should not be the targeted for imparting the trainings rather, more number of family members should be the target groups. The need based cost effective training programmes and strategies need to be tailored in an effective manner so that human resource be put to effective use for achieving sustainable apple production. It is to be

recommended that both extensive and intensive hand on-training programmes should be emphasized for farmers and rural youth through proper assessment of their training needs in the state. Further much emphasis should be paid on Integrated Disease Management, Soil and water testing, Training and pruning, Integrated Pest Management, Improvement in production and quality, Pre-harvest fruit drop while planning and designing training programmes for farmers. The concerned stakeholders should pay relatively higher emphasis and care on those specific important needs, as identified by this study through concerted efforts while formulating different training strategies and programmes for the farmers in the hills and plain areas of Kashmir valley and other similar agro-climatic and farming systems of the country. However certain constraints such as time limitation, limited resources, easy accessibility of the research area etc. cannot be eliminated in the study.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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