**Technology Adoption by Coffee Growers**

**Abstract**

Coffee crop is one of the major horticultural exports crop the coffee growers are looking the coffee cultivation has an enterprise/industry and also for the reason that huge amount of finance, manpower, land, input is involved in coffee production. As coffee production involves more of energy, huge financial and human involvement there is an adoption of good and improved production practices by coffee growers to get good yield and income. Hence, there is a need to study extent of adoption of improved production practices of coffee technologies by coffee growers. The study was conducted in Chikkamagaluru and Kodagu District of Karnataka to study the extent of adoption practices of coffee growers. Random sampling method was used to select 120 respondents. The primary data was collected from respondents using pre-tested interview schedule. For this purpose, an ex-post facto research design was employed. The overall adoption of improved cultivation practices of Coffee by the respondents was found that the majority (40.83 %) of the respondents belonged to the medium adoption category, followed by 33.34 per cent and 25.83 per cent of the respondents belonged to the high and low adoptive categories respectively. Majority (86.66 %) of the respondents have got optimum yield and 99.16 per cent have adopted cherry as their processing practice and 59.16 per cent of the respondents have adopted the parchment processing method of Coffee. And, 33.33 per cent of the respondents have adopted recommended grade specifications. Adequate knowledge about the recommended package of practices is the pre-requisite for use in the cultivation of crops. It is a fact that, recommended practices are major contributing factors to yield. So, inadequate knowledge about recommended practices leads to their improper adoption. The farmers were not fully aware of the recommended varieties, application of FYM, chemical fertilizers, bio fertilizer and pest and disease control measures. These are complex practices and require more education about practices in a more practical way.

Keywords: Adoption, Extent, Coffee growers, Cultivation practices, varieties

**Introduction**

 Coffee is the world’s second most traded commodity. In the modern urban life, coffee is a beverage and great socializer. Coffee is cultivated as a silvi-horti cropping system under a tree cover for better yield. Coffea species are shrubs or small trees native to tropical and southern Africa and tropical Asia. Indian Coffee is regarded as the best Coffee globally since it is cultivated in shade rather than direct sunlight. Coffee is grown in the tropical belt of the world where there is good sunshine with heavy rains and rich organic soil. India is the seventh largest producer of coffee in the world. More than 60 per cent of Indian coffee production is being exported. The Western Ghats in the southern peninsula of India forms the backbone of India’s coffee industry, covering the traditional coffee growing regions in the states of Karnataka, Kerala and Tamil Nadu, which account for more than 90 per cent of Indian coffee production. However, coffee is grown to a lesser extent in Andhra Pradesh, Orissa and North-Eastern states. The regions with high elevations are well suited for cultivating Arabica coffee of high quality. Those areas with warm humid conditions are more suited for growing Robusta coffee. Coffee crop is one of the major horticultural exports crop the coffee growers are looking the coffee cultivation has an enterprise/industry and also for the reason that huge amount of finance, manpower, land, input is involved in coffee production. As coffee production involves more of energy, huge financial and human involvement there is an adoption of good and improved production practices by coffee growers to get good yield and income. Hence, there is a need to study extent of adoption of improved production practices of coffee technologies by coffee growers.

**Methodology**

The study was conducted in Kodagu and Chikkamagaluru district of Karnataka. These districts were selected purposively because it had large area under coffee. Considering maximum area under coffee cultivation as criteria, two taluks were selected from each district namely Virajpet and Ponnampet from Kodagu district and Chikkamagaluru and Mudigere taluks in Chikkamagaluru district were selected for conducting the study. Three villages having maximum area under coffee cultivation were selected from each taluk and from each village 10 farmers growing coffee were selected by simple random sampling procedure. Thus, sample from each taluk was 30 making a total sample size of 120 respondents. Personal interview method was followed to collect the information in the light of objectives of the study. A schedule was developed and pretested in non-sample area was considered for the study. For this purpose, an ex-post facto research design was employed. The data collected were coded, analyzed and tabulated by using statistical tools such as frequency, percentage, mean, standard deviation and chi-square test.

**Results and discussion**

The data revealed from Table 1 that, the overall adoption of improved cultivation practices of Coffee by the respondents was found that the majority (40.83 %) of the respondents belonged to the medium adoption category, followed by 33.34 per cent and 25.83 per cent of the respondents belonged to the high and low adoptive categories respectively.

 **Table 1: Distribution of respondents based on overall Extent of adoption**

 **(n=120)**

| **Category** | **Respondents** |
| --- | --- |
| **Frequency** | **Percentage** |
| Low (<37.55) | 31 | 25.83 |
| Medium (37.55-39.99) | 49 | 40.83 |
| High (>39.99) | 40 | 33.34 |
| **Total** | **120** | **100.0** |

The results depicted in Table 2 indicated that, with respect to varieties, in Robusta 80.00 per cent of the respondents adopted the C\*R variety whereas, 79.16 per cent of the respondents adopted the S-274 Old variety. While, with respect to Arabica, 81.66 per cent of the respondents adopted the Hemavati variety, 80.83 per cent of the respondents adopted Selection 1,3,5,7,8,10,11,12, followed by 78.33 per cent of selection 9 variety, 77.50 per cent of the respondents adopted Chandragiri and Cauvery variety and 76.66 per cent of Selection-6 variety.

 In case of planting time, 83.33 per cent of respondents adopted the recommended June-July month for the planting of Coffee and 85.00 per cent of the respondents have chosen poly bag plants as their planting material.

 Further, the majority of the respondents (91.66 %) adopted Mixed cropping as their cropping pattern. Whereas, 8.33 per cent of the respondents have adopted mono-cropping as their cropping pattern and in the case of spacing, 83.33 per cent of the respondents adopted recommended spacing in Arabica, followed by 80.33 per cent in case of Robusta.

 It can be observed from Table 4 that 89.16 per cent of the respondents have planted silver oak and forest trees for shade followed by 82.50 per cent of the respondents have planted Alvanna trees for shade and regarding the size of the pits, 93.33 per cent of the respondents have adopted recommended size of the pits for planting Coffee.

Regarding plant population 84.16 per cent of the respondents have planted the ideal number of Coffee plants in robusta. Whereas, 83.33 per cent of the respondents have planted a recommended number of plants in arabica.

 Majority (85.83 %) of the respondents have followed recommended time of pruning and 77.50 per cent of the respondents have adopted recommended type of pruning.

 Nearly three fourth (75.80 %) of the respondents have adopted recommended type of shade regulation and 70.00 per cent of the respondents have adopted the recommended time of shade regulation. And, in case of irrigation 95.00 per cent of the respondents have adopted sprinkler irrigation followed by 90.83 per cent and 88.33 per cent of the respondents have given Back showers and Blossom showers at the recommended time.

Cent per cent of the respondents have followed recommended dose of fertilizer application and 87.50 per cent of the respondents have adopted recommended dose of lime application.

 To control the major pests, it can be observed from Table 4 that 85.00 per cent of the respondents used chemicals for control and 75.00 per cent of the respondents used cultural methods for controlling white stem borer. Regarding berry borer, 69.16 per cent of the respondents controlled chemically and 64.16 per cent of the respondents controlled culturally. 82.50 per cent of the respondents controlled shot hole borer followed by 83.33 per cent of the respondents who controlled green scales and mealy bugs chemically.

 To control disease, 80.00 per cent and 79.16 per cent of the respondents have adopted the recommended cultivation practices to control Koleroga and Rust disease respectively. Regarding harvest 90.83 per cent of the respondents have adopted recommended time for harvest and cent per cent of the respondents have adopted a manual method of harvesting and none of them have adopted a mechanized method of harvesting.

 Majority (86.66 %) of the respondents have got optimum yield and 99.16 per cent have adopted cherry as their processing practice and 59.16 per cent of the respondents have adopted the parchment processing method of Coffee. And, 33.33 per cent of the respondents have adopted recommended grade specifications.

**Table 2: Extent of adoption of improved cultivation practices of Coffee by the respondents**

 **(n=120)**

Contd…**…**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl. No** | **Recommended practices** | **Adoption** | **Non-****Adoption** |
| **F** | **%** | **F** | **%** |
| **1** | **Varieties** |  |  |
| a. | Robusta |  |  |
| i | S-274 Old | 95 | 79.16 | 25 | 20.84 |
| ii | C X R | 96 | 80.00 | 24 | 20.00 |
| b. | Arabica |  |  |
| i | Hemavathi | 98 | 81.66 | 22 | 18.34 |
| ii | Chandragiri | 93 | 77.50 | 27 | 22.50 |
| iii | Cauvery | 93 | 77.50 | 27 | 22.50 |
| iv | Selection 1,3,5,6,7,8,9,10,11,12 | 97 | 80.83 | 23 | 19.17 |
| **2**. | **Planting time** |  |  |
|  | Rainy (June-July Month) | 100 | 83.33 | 20 | 16.67 |
| **3.** | **Planting Material** |  |  |
|  | Poly bag plants | 102 | 85.00 | 18 | 15.00 |
| **4.** | **Cropping pattern** |  |  |
| a. | Mono cropping | 10 | 8.33 | 110 | 91.67 |
| b. | Mixed cropping | 110 | 91.66 | 10 | 8.34 |
| **5**. | **Spacing** |  |  |
| a. | Robusta (8ft X 8ft) | 97 | 80.83 | 23 | 19.17 |
| b. | Arabica (5ft X 6ft) | 100 | 83.33 | 20 | 16.67 |
| **6.** | **Standards used for shed** |  |  |
| i. | Erythrinaindica (Alvanna/Palvanna) | 99 | 82.50 | 21 | 17.50 |
| ii. | Silver oak | 107 | 89.16 | 13 | 10.84 |
| iii. | Forest trees | 107 | 89.16 | 13 | 10.84 |
| **7.** | **Size of the pits for planting coffee** |  |  |
|  | 45cm X 45cm X 45cm | 112 | 93.33 | 08 | 6.67 |
| **8.** | **Number of plants/acres** |  |  |
| a. | Robusta - 681 | 101 | 84.16 | 19 | 15.84 |
| b. | Arabica-1452 | 100 | 83.33 | 20 | 16.67 |
| **9.** | **Training and pruning of coffee** |  |  |
| a. | Time of pruning (month) | 103 | 85.83 | 17 | 14.17 |
| b. | Type of pruning | 93 | 77.50 | 27 | 22.50 |
| **10**. | **Shade regulation during monsoon season** |  |  |
| a. | Time of Shade regulation (month) | 84 | 70.00 | 36 | 30.00 |
| b. | Type of Shade regulation | 91 | 75.80 | 29 | 24.20 |
| **11.** | **Irrigation** |  |  |
| a | Blossom showers | 106 | 88.33 | 14 | 11.67 |
| b | Back showers | 109 | 90.83 | 11 | 9.17 |
| c | Method of irrigation sprinkler | 114 | 95.00 | 06 | 5.00 |
| **12.** | **Fertilizers applied** |  |  |
| a. | NPK-24:15:24gmper plant after 5th year | 120 | 100 | 00 | 00 |
| b. | Lime – 200 kg/ acre | 105 | 87.50 | 15 | 12.50 |
| **13.** | **Measures to control the major pests** |  |  |
| a. | **White stem borer** | Maintain/create optimum shade Or Install pheromone traps @ 25 /ha, if the incidence is high. | 90 | 75.00 | 30 | 25.00 |
|  |  | Pad with monocrotophos 36 WSC @ 5 ml. | 102 | 85.00 | 18 | 15.00 |
| b. | **Berry borer** | Meticulously remove the leftover berries.Remove offseason berries to save main crop. | 77 | 64.16 | 43 | 35.84 |
|  |  | Spray Quinalphos 25 EC @ 340 ml/200 lit or lamdacyhalothrin 5 EC 120 – 160 ml / 200 lit. | 83 | 69.16 | 37 | 30.84 |
| c | **Shot hole borer** | Spraying with Quinalphos 25 EC 2 ml/lit. | 99 | 82.50 | 21 | 17.50 |
| d | **Green scales and mealy bugs** | Monocrotophos 36 % SL- 1.5 ml/lit.orQuinalphos 25 % EC- 2.5 ml/lit. | 100 | 83.33 | 20 | 16.67 |
| **14.** | **Measures to control the major diseases** |  |  |
| a. | **Rust** | Spray 0.5% Bordeaux mixture | 95 | 79.16 | 25 | 20.84 |
| b. | **Koleroga** | Spray 1% of Bordeaux | 96 | 80.00 | 24 | 20.00 |
| **15** | **Months the coffee plant takes to start yielding after 4 years** |
|  | 8-9 months | 95 | 79.16 | 25 | 20.84 |
| **16** | **Harvest** |  |  |
| a. | Harvest during November and February | 109 | 90.83 | 11 | 9.17 |
| b | Method of harvest - Manual | 120 | 100 | 00 | 00 |
| **17** | **Yield** |  |  |
|  | 750 - 1000 kg dry parchment /ha | 104 | 86.66 | 16 | 13.34 |
| **18** | **Processing** |  |  |
| a. | Parchment | 71 | 59.16 | 49 | 40.84 |
| b. | Cherry | 119 | 99.16 | 01 | 0.84 |
| **19** | **Grade specification** |  |  |
|  | Washed, Unwashed, Monsooned, Instant, Ground, Roasted | 40 | 33.33 | 80 | 66.67 |

As evident from the data in Table 3 also reveal that occupation, farming experience, annual income, extension contact, market orientation, mass media exposure and credit orientation are significantly associated with the extent of adoption of Coffee growers at a 5per cent level of significance and extension participation is also significantly associated with the extent of adoption of Coffee growers at a1 per cent level of significance. Other variables like age, education, family size and land holding were a non-significant association with the extent of adoption of Coffee growers.

**Table** **3: Association between personal, socio-economic, psychological, and communication characteristics with the extent of adoption of Coffee growers**

|  |  |  |  |
| --- | --- | --- | --- |
| **Sl. No** | **Independent variables** | **p-value** | **Chi-square statistic** |
| 1 | Age | 0.514 | 3.266NS |
| 2 | Education | 0.202 | 5.965NS |
| 3 | Family size | 0.069 | 8.717NS |
| 4 | Occupation | 0.004 | 4.043\* |
| 5 | Land holding | 0.275 | 5.126NS |
| 6 | Annual income | 0.002 | 17.127\* |
| 7 | Farming experience | 0.023 | 11.289\* |
| 8 | Market orientation | 0.784 | 1.735\* |
| 9 | Mass media exposure | 0.029 | 10.781\* |
| 10 | Extension participation | 0.001 | 33.214\*\* |
| 11 | Extension contact | 0.017 | 12.042\* |
| 12 | Credit orientation | 0.025 | 11.182\* |

**\*Significant at 5% level of probability \*\* Significant at 1% level of probability**

**NS -Non significant**

**Conclusion**

Adequate knowledge about the recommended package of practices is the pre-requisite for use in the cultivation of crops. It is a fact that, recommended practices are major contributing factors to yield. So, inadequate knowledge about recommended practices leads to their improper adoption. The farmers were not fully aware of the recommended varieties, application of FYM, chemical fertilizers, bio fertilizer and pest and disease control measures. These are complex practices and require more education about practices in a more practical way.

**Reference:**

ANONYMOUS., 2021, Database on coffee 2021. Coffee Board Government of India, Bangalore, 2-64.

BHARATHKUMAR, T. P., 2010, Decision making and Time utilization pattern among women vegetable growers in Kolar district. *M.Sc. (Agri.) Thesis, (Unpub.),* Uni. Agri. Sci., Bengaluru.

CHETHAN, M. G., 2011, A study on knowledge and adoption of cardamom cultivation practices by the farmers of Chikmagalur district. *M. Sc. (Agri.) Thesis (Unpub.)*.

JAKKAWAD, S. R., RAJENDRA, SAWANT, C. AND PAWAR, S. B., 2017, Knowledge and adoption of ginger production technology in Aurangabad district. *Trends Biosci.,* **10**(24): 5111-5114.

KANKATE, M. A., TEKALE, V. S. AND THAKARE, P. N., 2018, Adoption of Improved Cultivation Practices of Turmeric in Yavatmal District, India. *Int. J. Curr. Microbiol. App. Sci.*, **7**(12): 640-647.

ROMAN, P. A., 2015, Study on adoption of onion production technology in Satara district. *M.Sc. (Agri.) Thesis (Unpub.),* M. P. K. V., Rahuri.