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Research Article

STUDIES ON KNOWLEDGE AND ADOPTION LEVELS OF FARMERS ON MULBERRY PRODUCTION PRACTICES UNDER IRRIGATED CONDITION IN CHAMARAJANAGAR DISTRICT, KARNATAKA STATE

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ABSTRACT

Knowledge and adoption levels of farmers play a vital role in determining the production and productivity of crops. In sericulture too, production and productivity of mulberry and cocoons were greatly determined by the extent of knowledge possessed by the farmers on sericulture technologies and its adoption. The present investigation was undertaken to know the knowledge and adoption levels of farmers for production of mulberry, a sole food plant for the silkworm, *Bombyx mori* L. in two taluks of Chamarajanagar district namely Kollegal and Yelandur. The study revealed that, majority of the farmers possesses full knowledge about length of mulberry cutting, season of planting and no. of crops to be taken up per year in all three categories of farmers (small, medium and big). On the other hand, more number in all the three categories of farmers had partial knowledge on land preparation, no. of buds/cutting, degree of planting, quantity of FYM, schedule of irrigation, time of weeding, plant protection measures and no. of DFLs reared/acre/crop. Further, majority of small and medium group of farmers did not have knowledge on soil type, mulberry variety, method of planting, fertilizer dose, mulberry variety and type of mulching. In respect of adoption of mulberry production practices, majority of the farmers had partially adopted the practices like land preparation, age of mulberry cutting, no. of buds/cutting, length of the cutting, method of planting, degree of planting, quantity of FYM, fertilizers dose, schedule of irrigation, time of weeding, preservation of leaf, plant protection measures and no. of DFLs reared/acre. The practices that comes under full adoption includes mulberry variety and no. of crops to be taken up per year, while few farmers did not adopt soil type required for mulberry and type of mulching in mulberry gardens.

INTRODUCTION

Sericulture is an agro-based industry which involves cultivation of food plants, silkworm rearing and cocoon production and silk reeling. It is a labour intensive rural industry assumes importance of its own, particularly in India where employment opportunities have to be created especially in the rural areas to provide gainful employment to the under employed, the unemployed and the landless persons.

In India, there are two ways of increasing silk production; one way is to expand the area and it cannot be done beyond certain extent, as sericulture competes with food crops. The second alternative is to increase the production per unit area by applying better methods of mulberry cultivation and rearing practices. These views were supported by Balasubramanian (1988), who observed that besides increasing the area, there is scope for increasing the productivity of silk per unit of land. The improvement in silk productivity was due to replacement of age-old low yielding local mulberry varieties and poor local multivoltine strains with high yielding mulberry varieties and cross breed as well as bivoltine silkworm strains, respectively coupled with adoption of improved practices for mulberry cultivation and silkworm rearing.

Even though sericulture is considered to be one of the important agricultural activities, the measurement of economic returns and the relative contribution of various inputs in the cocoon production system under rainfed and irrigated conditions play a major role in determining the cost of cocoon production. The pace of adoption of an innovation and consequent diffusion on a large scale is an essential feature of

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sericultural development. The adoption of innovations at an accelerated pace by large number of farmers is essentially a social process conditioned by variety of factors within and outside the social system concerned.

According to Lakshmanan and Geetha Devi (2007), the knowledge and adoption levels of sericulture technologies by farmers in Malavalli and Srirangapatna taluks of Mandya district, Karnataka was high regarding high yielding mulberry varieties, shoot harvesting method and separate rearing house as majority of the farmers were selected under Japanese International Cooperation Agency (JICA) and had the opportunity to gain knowledge about the improved technologies.

Srinivasulu Reddy *et al.* (2010) in their study in Anantapur, Chittoor and Coastal areas of Andhra Pradesh observed that cent per cent of the farmers had full knowledge with respect to improved mulberry varieties (85-100%), partial knowledge with Vipul and bio-fertilizer application (34-42%). With respect to other characters like soil testing, fertilizer application, FYM application, chawki garden maintenance and plant protection, the knowledge level was less/nil on Coastal area compared to Anantapur and Chittoor districts. The social and economic conditions of the farmers have played a major role in determining the knowledge and adoption of sericultural technologies both in traditional and non-traditional sericultural belts. Keeping these points in view, an investigation has been undertaken to know the knowledge and adoption levels of farmers on mulberry production practices under irrigated condition in Chamarajanagar District of Karnataka state.

METHODOLOGY

An investigation has been conducted in Chamarajanagar district of Karnataka state, India. A total of 120 farmers, 60 each from Kollegal and Yelandur taluks were considered for the study. The selection of villages and number of farmers interviewed for collection of data in each taluk depends on the mulberry area and number of farmers practicing sericulture. The study was formulated based on the preliminary field survey and in consultation with Technical Staff of the State Department of Sericulture in different taluks of the Chamarajanagar district.

Source and method of data collection

Information on the sericultural practices among the farmers of the irrigated condition was collected through formal discussion using interview schedule. Data pertaining to knowledge and adoption levels of mulberry production practices among three groups of farmers namely small (<0.83 acre) (12 Nos.), medium (0.84 to 1.94 acre) (75 Nos.) and big land holdings (>1.95 acre) (33 Nos.) on mulberry production were collected.

Knowledge level: The respondents were asked about the knowledge on mulberry production practices. The response given by the farmers were categorized into three namely full, partial and no knowledge based on the level of knowledge. The percentage was given to categories as full, partial and no knowledge, respectively.

Adoption level: The mulberry production practices were used for testing knowledge level was used to test adoption level also. Same as knowledge level testing, the response of respondents for adoption of technologies was recorded. The percentage was given to category as full, partial and non- adoption, respectively.

Analysis of data

The analysis of data was carried out adopting the statistical tools like frequencies, percentages and mean.

RESULTS

Knowledge and adoption levels of farmers on mulberry production practices under irrigated condition were categorized as full, partial and no knowledge/adoption among three groups of farmers namely small, medium and big are tabulated in Tables 1 to 3 and are explained in the following paragraphs:

Soil type

Majority of the small and medium farmers had no knowledge about the type of soil required for mulberry cultivation (n=7, 58.33%; n=33, 44.00%), while among big farmers, majority of them had full knowledge (n=16, 48.48%) followed by full knowledge among small farmers (n=4, 33.33%), partial knowledge among medium farmers (n=24, 32.00%) and no knowledge among big farmers (n=9, 27.27%). However, 1 small farmer had partial knowledge (8.33%), 18 medium farmers had full knowledge (24.00%) and 8 big farmers had partial knowledge (24.24%). Among the total category of farmers, majority of the farmers had no knowledge (n=49, 40.83%) and 38 and 33 farmers possess full (31.67%) and partial knowledge (27.50%), respectively.

In adoption, among 12 small farmers, 4 farmers each under full (33.33%), partial (33.33%) and non-adoption (33.33%). In respect of medium category of farmers, majority of the farmers (n=31, 41.33%) belong to non-adoption and 30 and 14 farmers were under partial (40.00%) and full adoption (18.67%). However, among big farmers, 16 of them were under full adoption (48.48%) and 9 and 8 farmers are under none (27.27%) and partial adoption (24.24%). In total, majority of the farmers were under non-adoption category (n=44, 36.67%) as compared to partial (n=42, 35.00%) and full adoption (n=34, 28.33%).

Land preparation

In irrigated condition, among small farmers, 6 farmers each had partial and no knowledge (50.00%) about the preparation of land for cultivation of mulberry as against 45 and 19 medium and big farmers had partial knowledge (60.00 and 57.58%), respectively. However, 18 and 12 medium farmers had no (24.00%) and full knowledge (16.00%) and 7 big farmers each had full and no knowledge (21.21%). Under total category, majority of the farmers had partial knowledge (n=70, 58.33%) over no (n=31, 25.83%) and full knowledge (n=19, 15.83%).

Large number of small farmers (n=9, 75.00%) were under partial adoption category in respect of preparation of land for cultivation of mulberry and 3 of them were under non-adoption category (25.00%). In medium and big category of farmers too, majority of them fell under partial adoption category (n=62, 82.67%; n=27, 81.82%). In total, 98 farmers were in partial

adoption category (81.67%) and 16 and 6 of them were under full (13.33%) and non-adoption categories (5.00%).

n=32, 96.97%) were under full adoption and few farmers (n=6, 8.00%; n=1, 3.03%) were under non-adoption category.

Table 1 Knowledge level of farmers on mulberry production practices under irrigated condition

Sl. No.	Practice	Small farmers (n=12)						Medium farmers (n=75)						Big farmers (n=33)					
		Full		Partial		No		Full		Partial		No		Full		Partial		No	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Soil type	4	33.33	1	8.33	7	58.33	18	24.00	24	32.00	33	44.00	16	48.48	8	24.24	9	27.27
2	Land preparation	0	0.00	6	50.00	6	50.00	12	16.00	45	60.00	18	24.00	7	21.21	19	57.58	7	21.21
3	Mulberry variety	4	33.33	1	8.33	7	58.33	27	36.00	17	22.67	31	41.33	17	51.52	10	30.30	6	18.18
4	Age of mulberry cutting	2	16.67	2	16.67	8	66.67	7	9.33	39	52.00	29	38.67	7	21.21	20	60.61	6	18.18
5	No. of buds/cutting	1	8.33	10	83.33	1	8.33	15	20.00	55	73.33	5	6.67	15	45.45	17	51.52	1	3.030
6	Length of the cutting	8	66.67	2	16.67	2	16.67	50	66.67	12	16.00	13	17.33	18	54.55	8	24.24	7	21.21
7	Season of planting	10	83.33	0	0.00	2	16.67	61	81.33	7	9.33	7	9.33	33	100.0	0	0.00	0	0.00
8	Method of planting	0	0.00	2	16.67	10	83.33	12	16.00	28	37.33	35	46.67	7	21.21	15	45.45	11	33.33
9	Plant spacing	2	16.67	5	41.67	5	41.67	40	53.33	28	37.33	7	9.33	22	66.67	10	30.30	1	3.03
10	Degree of planting cutting	0	0.00	10	83.33	2	16.67	4	5.33	63	84.00	8	10.67	5	15.15	28	84.85	0	0.00
11	Quantity of FYM	0	0.00	8	66.67	4	33.33	16	21.33	49	65.33	10	13.33	13	39.39	14	42.42	6	18.18
12	Fertilizer dose	0	0.00	2	16.67	10	83.33	12	16.00	28	37.33	35	46.67	7	21.21	15	45.45	11	33.33
13	Schedule of irrigation	0	0.00	12	100.0	0	0.00	12	16.00	60	80.00	3	4.00	7	21.21	23	69.70	3	9.09
14	Time of weeding	0	0.00	12	100.0	0	0.00	12	16.00	60	80.00	3	4.00	7	21.21	23	69.70	3	9.09
15	Type of mulching	1	8.33	3	25.00	8	66.67	19	25.33	17	22.67	39	52.00	19	57.58	6	18.18	8	24.24
16	No. of prunings/year	2	16.67	7	58.33	3	25.00	40	53.33	32	42.67	3	4.00	22	66.67	8	24.24	3	9.09
17	Preservation of leaf	2	16.67	9	75.00	1	8.33	40	53.33	29	38.67	6	8.00	22	66.67	9	27.27	2	6.06
18	Plant protection measures	1	8.33	7	58.33	4	33.33	16	21.33	45	60.00	14	18.67	11	33.33	21	63.64	1	3.03
19	No. of crops/year	7	58.33	4	33.33	1	8.33	62	82.67	4	5.33	9	12.00	25	75.76	0	0.00	8	24.24
20	No. of DFLs reared/acre/crop	2	16.67	10	83.33	0	0.00	22	29.33	45	60.00	8	10.67	12	36.36	19	57.58	2	6.06

Table 2 Adoption level of farmers on mulberry production practices under irrigated condition

Sl. No.	Practice	Small farmers (n=12)						Medium farmers (n=75)						Big farmers (n=33)					
		Full		Partial		No		Full		Partial		No		Full		Partial		No	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Soil type	4	33.33	4	33.33	4	33.33	14	18.67	30	40.00	31	41.33	16	48.48	8	24.24	9	27.27
2	Land preparation	0	0.00	9	75.00	3	25.00	10	13.33	62	82.67	3	4.00	6	18.18	27	81.82	0	0.00
3	Mulberry variety	8	66.67	0	0.00	4	33.33	62	82.67	7	9.33	6	8.00	32	96.97	1	3.03	0	0.00
4	Age of mulberry cutting	0	0.00	7	58.33	5	41.67	6	8.00	62	82.67	7	9.33	2	6.06	31	93.94	0	0.00
5	No. of buds/cutting	0	0.00	12	100.0	0	0.00	6	8.00	64	85.33	5	6.67	0	0.00	33	100.0	0	0.00
6	Length of the cutting	1	8.333	9	75.00	2	16.67	2	2.67	72	96.00	1	1.33	2	6.06	28	84.85	3	9.09
7	Season of planting	5	41.67	5	41.67	2	16.67	55	73.33	8	10.67	12	16.00	27	81.82	3	9.09	3	9.09
8	Method of planting	0	0.00	12	100.0	0	0.00	12	16.00	55	73.33	8	10.67	7	21.21	21	63.64	5	15.15
9	Plant spacing	0	0.00	2	16.67	10	83.33	31	41.33	14	18.67	30	40.00	19	57.58	8	24.24	6	18.18
10	Degree of planting cutting	0	0.00	10	83.33	2	16.67	3	4.00	69	92.00	3	4.00	0	0.00	33	100.0	0	0.00
11	Quantity of FYM	0	0.00	11	91.67	1	8.333	12	16.00	56	74.67	7	9.33	12	36.36	21	63.64	0	0.00
12	Fertilizer dose	0	0.00	10	83.33	2	16.67	8	10.67	53	70.67	14	18.67	7	21.21	20	60.61	6	18.18
13	Schedule of irrigation	0	0.00	9	75.00	3	25.00	11	14.67	56	74.67	8	10.67	0	0.00	26	78.79	7	21.21
14	Time of weeding	0	0.00	12	100.0	0	0.00	1	1.33	70	93.33	4	5.33	5	15.15	23	69.70	5	15.15
15	Type of mulching	1	8.33	0	0.00	11	91.67	17	22.67	13	17.33	45	60.00	15	45.45	1	3.03	17	51.52
16	No. of prunings/year	2	16.67	10	83.33	0	0.00	36	48.00	35	46.67	4	5.33	16	48.48	11	33.33	6	18.18
17	Preservation of leaf	0	0.00	12	100.0	0	0.00	4	5.33	63	84.00	8	10.67	5	15.15	26	78.79	2	6.06
18	Plant protection measures	0	0.00	8	66.67	4	33.33	11	14.67	53	70.67	11	14.67	10	30.30	21	63.64	2	6.06
19	No. of crops/year	9	75.00	0	0.00	3	25.00	65	86.67	6	8.00	4	5.33	25	75.76	4	12.12	4	12.12
20	No. of DFLs reared/acre/crop	0	0.00	12	100.0	0	0.00	11	14.67	58	77.33	6	8.00	7	21.21	25	75.76	1	3.03

Mulberry variety

Large number of small and medium farmers had no knowledge on cultivation of mulberry variety (n=7, 58.33%; n=31, 41.33%) recommended for the region followed by full (n=4, 33.33; n=27, 36.00%) and partial knowledge (n=1, 8.33%; n=17, 22.67%), respectively. Among the big farmers, majority of them are having full knowledge (n=17, 51.52%) over partial (n=10, 30.30%) and no knowledge (n=6, 18.18%). In totality, major group of farmers had full knowledge (n=48, 40.00%) as compared to no (n=44, 36.67%) and partial knowledge (n=28, 23.33%).

In adoption, 8 out of 12 small farmers fully adopted mulberry variety (66.67%). Similarly, among medium and big farmers category also, large number of farmers (n=62, 82.67% and

In total category also, more farmers were under full adoption group (n=102, 85.00%) followed by non-adoption (n=10, 8.83%) and partial adoption (n=8, 6.67%).

Age of mulberry cutting

Majority of the small farmers had no knowledge about the age of mulberry cutting used for planting (n=8, 66.67%), while large number of medium and big farmers had partial knowledge (n=39, 52.00%; n=20, 60.61%). However, 2 small farmers each had full knowledge (16.67%), 29 medium farmers had no knowledge (38.67%) and 7 big farmers had full knowledge (21.21%) as compared to 7 and 6 medium and big farmers had full (9.33%) and no knowledge (18.18%), respectively. In total, 61 farmers had partial knowledge (50.83%), 43 farmers had no knowledge (35.83%) and 16

farmers had full knowledge (13.33%) about the age of mulberry cutting.

Table 3 Knowledge and adoption levels of farmers on mulberry production practices under irrigated condition

Sl. No.	Practice	Knowledge (Pooled) (n=120)						Adoption (Pooled) (n=120)					
		Full		Partial		No		Full		Partial		No	
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
1	Soil type	38	31.67	33	27.50	49	40.83	34	28.33	42	35.00	44	36.67
2	Land preparation	19	15.83	70	58.33	31	25.83	16	13.33	98	81.67	6	5.00
3	Mulberry variety	48	40.00	28	23.33	44	36.67	102	85.00	8	6.67	10	8.33
4	Age of mulberry cutting	16	13.33	61	50.83	43	35.83	8	6.67	100	83.33	12	10.00
5	No. of buds/cutting	31	25.83	82	68.33	7	5.83	6	5.00	109	90.83	5	4.17
6	Length of the cutting	76	63.33	22	18.33	22	18.33	5	4.17	109	90.83	6	5.00
7	Season of planting	104	86.67	7	5.83	9	7.50	87	72.50	16	13.33	17	14.17
8	Method of planting	19	15.83	45	37.50	56	46.67	19	15.83	88	73.33	13	10.83
9	Plant spacing	64	53.33	43	35.83	13	10.83	50	41.67	24	20.00	46	38.33
10	Degree of planting	9	7.50	101	84.17	10	8.33	3	2.50	112	93.33	5	4.17
11	Quantity of FYM	29	24.17	71	59.17	20	16.67	24	20.00	88	73.33	8	6.67
12	Fertilizer dose	19	15.83	45	37.50	56	46.67	15	12.50	83	69.17	22	18.33
13	Schedule of irrigation	19	15.83	95	79.17	6	5.00	11	9.17	91	75.83	18	15.00
14	Time of weeding	19	15.83	95	79.17	6	5.00	6	5.00	105	87.50	9	7.50
15	Type of mulching	39	32.50	26	21.67	55	45.83	33	27.50	14	11.67	73	60.83
16	No. of prunings/year	64	53.33	47	39.17	9	7.50	54	45.00	56	46.67	10	8.33
17	Preservation of leaf	64	53.33	47	39.17	9	7.50	9	7.50	101	84.17	10	8.33
18	Plant protection measures	28	23.33	73	60.83	19	15.83	21	17.50	82	68.33	17	14.17
19	No. of crops/year	94	78.33	8	6.67	18	15.00	99	82.50	10	8.33	11	9.17
20	No. of DFLs reared/acre/crop	36	30.00	74	61.67	10	8.33	18	15.00	95	79.17	7	5.83

Large number of farmers (n=7, 58.33%) partially adopted the age of the mulberry cutting as against 5 of them who did not adopt the technology (41.67%). About 62 medium farmers partially adopted the technology of correct age of mulberry cutting as propagation material (82.67%) when compared to 7 and 6 farmers who are under non-adoption (9.33%) and full adoption (8.00%) categories. In big farmers category, 31 out of 33 farmers were under partial adoption (93.94%) and 2 farmers under full adoption (6.06%). In total, 100 farmers were under partial adoption (83.33%) over 12 and 8 farmers who had non-adoption (10.00%) and full adoption (6.670%).

No. of buds/cutting

Knowledge on number of buds/cutting in mulberry used for propagation was known partially by majority of the small (n=10, 83.33%), medium (n=55, 73.33%) and big farmers (n=17, 51.52%). Only 1 farmer each had full and no knowledge (8.33%) among small farmers, 15 farmers each had full knowledge among medium and big farmers (20.00 and 45.45%) and 5 and 1 farmers had no knowledge (6.67 and 3.03%), respectively. Among the total groups of farmers, 82 farmers had partial knowledge (68.33%) followed by 31 farmers had full (25.83%) and 7 farmers had no knowledge (5.83%).

All the small (n=12) and big farmers (n=33) fell under the category of partial adoption. In medium category of farmers too, large group of farmers were under the purview of partial adoption (n=64, 85.33%) as against 6 and 5 farmers who are under full (8.00%) and non adoption (6.67%). In total, 109 farmers were under partial adoption (90.83%) and 6 and 5 farmers were in the group of full (5.00%) and non-adoption categories (4.17%), respectively.

Length of the cutting

Large groups of farmers had full knowledge with regard to small (n=8, 66.67%), medium (n=50, 66.67%) and big farmers (n=18, 54.55%). Further, 2 small farmers each had partial and no knowledge (16.67%), 13 and 12 medium farmers had no

farmers had partial (24.24%) and no knowledge (21.21%), respectively. In total, 76 farmers had full knowledge (63.33%) and 22 farmers each had partial and no knowledge (18.33%).

In adoption, partial adoption encompasses maximum number of farmers under small (n=9, 75.00%), medium (n=72, 96.00%) and big farmers categories (n=28, 84.85%) as compared to full and non-adoption categories. In total category of farmers, nearly 109 farmers were in the group of partial adoption (90.83%) as against 6 and 5 farmers who are under non-adoption (5.00%) and full adoption categories (4.17%).

Season of planting

With respect to season of planting, majority of the small farmers had full knowledge (n=10, 83.33%) about season of planting mulberry when compared to 2 farmers who had no knowledge (16.67%). Among medium farmers, 61 of them had full knowledge (81.33%) and 7 farmers each had partial and no knowledge (9.33%) and all the big farmers (n=33, 100.0%) had full knowledge about season of planting. Similarly, in total category of farmers, 104 farmers had full knowledge (86.67%) followed by 9 and 7 farmers had no (7.50%) and partial knowledge (5.83%), respectively.

Among farmers, 5 small farmers each were under full and partial adoption in respect of season of planting (41.67%) and 2 farmers were under non-adoption category (16.67%). In medium and big farmers category, maximum farmers were under full adoption (n=55, 73.33%; n=27, 81.82%) as against partial and non-adoption. In total also, large number of farmers were under full adoption category (n=87, 72.50%) and 17 and 16 of them were under non-adoption (14.17%) and partial adoption categories (13.33%).

Method of planting

Among small farmers, majority of them had no knowledge about method of planting mulberry (n=10, 83.33%) and only 2 farmers had partial knowledge (16.67%). In medium farmers category, 35, 28 and 12 farmers had no (46.67%), partial (37.33%) and full knowledge (16.00%), while among big farmers, 15 farmers had partial knowledge (45.45%) followed by no (n=11, 33.33%) and full knowledge (n=7, 21.21%), respectively. In total, 56 farmers had no knowledge (46.67%) followed by farmers who had no knowledge (n=45, 37.50%) and 19 farmers had full knowledge (15.83%) about method of planting mulberry.

All small farmers were fully adopted the correct method of planting (100.0%). Similarly, among medium farmers, 55 of them were under partial adoption (73.33%). In big farmers, 21 of them had partially adopted the method of planting (63.64%). Among the total category of farmers also, maximum farmers were under full adoption (n=88, 73.33%) while 19 and 13 farmers were under full (15.83%) and non-adoption (10.83%).

Plant spacing

Among farmers, 5 farmers each possess partial and no knowledge (41.67%) about plant spacing among small farmers category and 2 of them possess full knowledge (16.67%). However, among medium and big farmers, 40 and 22 possess full knowledge (53.33% and 66.67%) followed by 28 and 10 possess partial knowledge (37.33% and 30.30%) and 7 and 1 possess no knowledge (9.33 and 3.03%). In total category, 64 farmers possess full knowledge (53.33%) as compared to 43 and 13 of them possess full (35.83%) and no knowledge (10.83%).

In respect of adoption, 10 out of 12 farmers did not adopt recommended plant spacing (83.33%) and only 2 of them partially adopted the technology (16.67%). On the other hand, nearly 31 and 30 medium farmers fell under full (41.33%) and non-adoption categories (40.00%) and 14 of them under partial adoption category (18.67%). However, among big farmers, 19 of them were in full adoption group (57.58%) as against 8 and 6 farmers in partial (24.24%) and non-adoption group (18.18%). In total, 50, 46 and 24 farmers coming under full (41.67%), non-adoption (38.33%) and partial adoption categories (20.00%), respectively.

Degree of planting cutting

More number of small (n=10), medium (n=63) and big farmers (n=28) had partial knowledge (83.33, 84.00 and 84.85%) followed by no knowledge among small farmers (n=2, 16.67%), 8 and 4 medium farmers (10.67 and 5.330%) who had no and full knowledge and 5 big farmers had full knowledge (15.15%) about degree of planting cutting. Among the total category of farmers, 101 farmers had partial knowledge (84.17%) when compared to 10 and 9 farmers had no (8.33%) and full knowledge (7.50%), respectively.

In adoption 10 small farmers had partially adopted the correct degree of planting (83.33%) as against 2 farmers who are under non-adoption (16.67%). In medium farmers category, 69 farmers were under partial adoption (92.00%) and 3 farmers each were under full and non-adoption (4.00%). However, all the big farmers (n=33) were in the group of partial adoption category. In total, 112 farmers fell in the group of partial adoption (93.33%) and 5 and 3 farmers are in non-adoption (4.17%) and full adoption categories (2.50%).

Quantity of FYM

Among small farmers, majority (n=8, 66.67%) of them possess partial knowledge on quantity of FYM to be applied for mulberry and 4 of them did not possess any knowledge (33.33%). Similarly, large group of medium (n=49, 65.33%), big (n=14, 42.42%) and total category of farmers (n=71, 59.17%) are having partial knowledge when compared to other farmers *i.e.,* 16, 13 and 29 of them who possess full knowledge (21.33, 39.39 and 24.17%) and less number of farmers *i.e.,* 10, 6 and 20 did not possess any knowledge (13.33, 18.18 and 16.67%) over application of required quantity of FYM for mulberry.

Among small farmers, 11 out of 12 farmers applied required quantity of FYM partially (91.67%) and only 1 of them did not adopt (8.33%). In medium farmers category, 56 of them were under partial adoption (74.67%) followed by 12 and 7 farmers were under full (16.00%) and non-adoption groups (9.33%). Likewise, in big farmers, 21 farmers partially adopted (63.64%) and only 12 farmers fully adopted the technology (36.36%). In total category, as high as 88 farmers practiced the technology partially (73.33%) over 24 and 8 farmers were in full (20.00%) and partial adoption (6.67%).

Fertilizer dose

Maximum number of small farmers (n=10) did not possess knowledge on application of recommended dose of fertilizers for mulberry garden (83.33%) and only 2 farmers possess partial knowledge (16.67%). However, partial knowledge was possessed by large group of medium (n=28, 37.33%), big (n=15, 45.45%) and few farmers possess full knowledge (n=12, 16.00% and n=7, 21.21%). In the total category, 56 farmers possess no knowledge (46.67%) followed by 45 and 19 farmers who possess partial and full knowledge (37.50 and 15.83%), respectively.

The small farmers (n=10, 83.33%) applied recommended quantity of fertilizers partially and only 2 did not adopt the technology (16.67%). Similarly, among medium and big farmers, 53 and 20 farmers who had partially applied the recommended dose of fertilizers (70.67 and 60.61%) when compared to other two levels of adoption. In the total category, 83 farmers applied recommended dose of fertilizers partially (69.17%) over 22 and 15 farmers who are under non-adoption (18.33%) and full adoption categories (12.50%), respectively.

Schedule of irrigation

Cent per cent of small farmers (n=12) partially know about schedule of irrigation for mulberry. Similarly, large number of medium (n=60, 80.00%) and big farmers (n=23, 69.70%) partially know about schedule of irrigation and very few medium (n=3 4.00%) and big farmers (n=3, 9.09%) did not know about schedule of irrigation. In total, maximum number of farmers know about schedule of irrigation partially (n=95, 79.17%), 19 farmers possess full knowledge (15.83%) and only 6 farmers had no knowledge (5.00%).

Majority of the farmers under irrigated condition partially adopted schedule of irrigation for mulberry garden in all the

three categories of farmers namely small (n=9, 75.00%), medium (n=56, 74.67%) and big farmers (n=26, 78.79%) over other two levels of adoption. In the total category, 91 farmers practiced schedule of irrigation partially (75.83%) followed by the farmers who are in non-adoption (n=18, 15.00%) and full adoption categories (n=11, 9.17%).

Time of weeding

All the small farmers (n=12, 100.0%) had partial knowledge about time of weeding in mulberry gardens. Similarly, majority of the medium and big farmers had partial knowledge (n=60, 80.00%; n=23, 69.70%) and 12 and 7 farmers had full knowledge (16.00 and 21.21%) and 3 farmers each had no knowledge (4.00% and 9.09%), respectively. In total, 95 farmers know time of weeding partially (79.17%) over 19 and 6 farmers have full (15.83%) and no knowledge (5.00%).
All the respondents (n=12) practiced time of weeding partially in mulberry gardens. Similarly, maximum number of medium and big farmers followed time of weeding operation partially (n=70, 93.33%; n=23, 69.70%) when compared to other two levels of adoption. Altogether, 105 farmer respondents practiced time of weeding partially (87.50%) as against 9 and 6 of them who are in non-adoption (7.50%) and full adoption categories (5.00%).

Type of mulching

Majority of small farmers (n=8, 66.67%) did not have knowledge on type of mulching in mulberry gardens and 3 of them had partial knowledge (25.00%) and 1 farmer had full knowledge (8.33%). Similarly, majority of the medium farmers also have no knowledge (n=39, 52.00%) and 19 farmers had full knowledge (25.33%) and 17 of them had partial knowledge (n=22.67%). On the contrary, majority of big farmers had full knowledge about type of mulching (n=19, 57.58%) over other farmers of the same categories. In total category, 55 of them had no knowledge (45.83%), followed by 39 and 26 farmers had full (32.50%) and partial knowledge (21.67%).

In adoption, 11 small (91.67%), 45 medium (60.00%) and 17 big farmers (51.52%) did not adopt mulching in mulberry and 1 (8.33%), 17 (22.67%) and 15 (45.45%) farmers had fully adopted the practice of mulching in mulberry, respectively. In total, 73 farmers did not practice mulching (60.83%) as against 33 and 14 are under full (27.50%) and partial adoption categories (11.67%), respectively.

Number of prunings/year

In respect of knowledge level, 7 out of 12 small farmers had partial knowledge about number of prunings to be undertaken per year in mulberry (58.33%) and 3 and 2 of them had no (25.00%) and full knowledge (16.67%). On the other hand, large number of medium (n=32, 42.67%), big (n=22, 66.67%) and total category of farmers (n=64, 53.33%) and few farmers had no knowledge (n=3, 4.00%; n=3, 9.09%; n=9, 7.50%), respectively.

Among farmers, 10 out of 12 small farmers partially adopted number of prunings/year in mulberry (83.33%) and only 2 farmers adopted fully (16.67%). However, among medium and big farmers, 36 and 16 of them are in full adoption (48.00 and 48.48%) followed by partial (n=35, 46.67%; n=11, 33.33%) and non-adoption (n=4, 5.33%; n=6, 18.18%), respectively. Among the total category of farmers, 56 of them are under partial adoption (46.67%) over full (n=54, 45.00%) and non-adoption (n=10, 8.33%).

Preservation of leaf

In respect of knowledge level, 9 small farmers partially know about preservation of leaf (75.00%) and 1 farmer had no knowledge (8.33%). However, in medium, big and total category of farmers 40, 22 and 64 farmers possess full knowledge (53.33, 66.67 and 53.33%) when compared to 29, 9 and 47 farmers who had partial knowledge (38.67, 27.27 and 39.17%) and 6, 2 and 9 of them had no knowledge (8.00, 6.06 and 7.50%), respectively.

All the small farmers (n=12) partially adopted preservation of leaf. Among medium and big farmers also, maximum number of respondents adopted the practice of preservation of leaf partially (n=63, 84.00%; n=26, 78.79%) over other two levels of adoption. In total, 101 farmers partially adopted the preservation of leaf (84.17%) as against 10 and 9 farmers who are under non-adoption (8.33%) and full adoption of the practice (7.50%).

Plant protection measures

In irrigated condition, 7 small farmers had partial knowledge on plant protection measures for mulberry (58.33%) and 4 and 1 farmers possess no (33.33%) and full knowledge (8.33%). In respect of medium, big and total category of farmers, 45, 21 and 73 farmers were having partial knowledge (60.00, 63.64 and 60.83%) and less farmers were having no knowledge (n=14, 18.67%, n=1, 3.03% and n=19, 15.83%), respectively.

With respect to adoption, 8 respondents partially adopted the plant protection measures (66.67%) and 4 of them did not adopt the measures (33.33%). Among medium farmers, 53 respondents are in partial adoption (70.67%) and 11 each under full and non-adoption categories (14.67%). Similarly, among big and total category of farmers also, maximum farmers were in the group of partial adoption (n=21, 63.64%; n=82, 68.33%) followed by full (n=10, 30.30%; n=21, 17.50%) and non-adoption (n=2, 6.06%; n=17, 14.17%), respectively.

Number of crops/year

In respect of knowledge level, 7 small farmers had full knowledge (58.33%) and 4 and 1 farmers had partial (33.33%) and no knowledge (8.33%). In medium and big farmers, 62 and 25 farmers had full knowledge about number of crops per year (82.67 and 75.76%) over other two knowledge levels. In total category, 78.33% of farmers had full knowledge (n=94) followed by 18 and 8 farmers possess no (15.00%) and partial knowledge (6.67%).

With respect to adoption level, 9 small farmers fully adopted the number of crops/year (75.00%) and over 3 of them were under non-adoption (25.00%). Similarly, among medium and big farmers, 65 and 25 farmers fully adopted number of crops/year (86.67 and 75.76%). In total, 99 farmers could adopt number of crops/year fully (82.50%) followed by 11 and 10 farmers are in non-adoption (9.17%) and partial adoption (8.33%).

Number of DFLs reared/acre/crop

Large number of small, medium and big farmers possess partial knowledge about number of DFLs reared/acre/crop (n=10, 83.33%; n=45, 60.00%; n=19, 57.58%) followed by full knowledge (n=2, 16.67%; n=22, 29.33% and n=12, 36.36%). In total, 74 farmers had partial knowledge (61.67%) and 36 and 10 farmers had full (30.00%) and no knowledge (8.33%), respectively.

All the small farmers adopt number of DFLs reared/acre/crop partially. Likewise, among medium and big farmers, most farmers are in partial adoption (n=58, 77.33% and n=25, 75.76%) as against other two levels of adoption. Altogether, 95 farmers who are in partial adoption (79.17%) when compared to full (n=18, 15.00%) and non-adoption categories (n=7, 5.83%), respectively.

DISCUSSION

In respect of knowledge level of farmers on mulberry production practices under irrigated condition, majority of the farmers in the study area possess full knowledge on mulberry variety, length of the cutting, season of planting, plant spacing, no. of pruning/year, preservation of leaf and no. of crops/year. However, maximum number of farmers had partial knowledge on land preparation, age, of mulberry cuttings, no. of buds/cutting, degree of planting, quantity of FYM, schedule of irrigation, time of weeding, plant protection measures and no. of DFLs reared/acre/crop. Further, majority of farmers did not have knowledge on soil type, method of planting, fertilizer dose and type of mulching. With respect to adoption of mulberry production practices by farmers, majority of the farmers were partially adopted the practices like land preparation, age of mulberry cutting, no. of buds/cutting, length of the cutting, method of planting, degree of planting, quantity of FYM, fertilizers dose, schedule of irrigation, time of weeding, no. of pruning/year, preservation of leaf, plant protection measures and no. of DFLs reared/acre. The practices comes under full adoption of technologies includes mulberry variety, season of planting, plant spacing and no. of crops/year and few farmers who did not adopt soil type and type of mulching in mulberry gardens.

The current results are in conformation with those of Bhilegonkar (1978), where little over half of the farmer respondents possess medium level of knowledge on the use of recommended dose of fertilizers. According to Srinivasa (1989), all the farmers of the study area had full knowledge about mulberry variety, preparation of land, planting system and irrigation of mulberry.

Gope (2006) in his study in traditional and non-traditional areas of sericulture noticed that all the selected farmers had high knowledge of mulberry variety, plant spacing and quality of leaf. Most of the farmers in non-traditional area had better knowledge about new technologies than those in traditional area. But the knowledge regarding soil type and manure was more in traditional area than non-traditional area. According to Lakshmanan and Geetha Devi (2007), the knowledge and adoption levels of sericulture technologies of farmers in Malavalli and Srirangapatna taluks of Mandya district, Karnataka was more for high yielding mulberry varieties.

A study conducted in Iran revealed that, large number of farmers did not have adequate knowledge about improved mulberry cultivation practices like method of harvesting and pruning (Mohammad Karim Motamed, 2010). Srinivasulu Reddy *et al.* (2010) in their study in Anantapur, Chittoor and Coastal areas of Andhra Pradesh observed that cent per cent of the farmers had full knowledge with respect to improved mulberry varieties (85-100%), partial knowledge with Vipul and bio-fertilizer application (34-42%). With respect to other characters like soil testing, fertilizer application, FYM application, chawki garden maintenance and plant protection, the knowledge level was less/nil in Coastal area compared to Anantapur and Chittoor districts.

As per Thiagarajan (2002), majority of the farmers in rainfed areas had poor knowledge about recommended mulberry variety, application of FYM, fertilizers, biofertilizers. Adequate knowledge was observed only for plant spacing and most of the farmers had partial knowledge on method of leaf harvest. As per Mallikarjuna *et al.* (2006), knowledge level of sericulturists on mulberry cultivation technologies in Chamarajanagar district varied from 7% (Vipul application) to 82% (application of recommended dose of FYM). Vijaya Prakash and Dandin (2005) observed that adoption of mulberry technologies by the farmers related to plant spacing and harvesting of mulberry leaves were highest (100%), followed by irrigation (95.08%), FYM application (91.80%).

Sujatha *et al.* (2006) observed high adoption for plantation spacing and application of FYM. Adoption was nil/low for practices like biofertilizer, vermiculture and mulching. The adoption level among different categories of farmers was in the order of big farmers>small farmers>marginal farmers. Lakshmanan and Geetha Devi (2007) reported 62% of sericulturists adopted high yielding mulberry varieties, application of manure (36%) and leaf harvesting method (33.75%).

A study conducted by Mir *et al.* (2018) on adoption of mulberry production practices in four districts of Kashmir valley indicated that none of the stakeholders fully applied FYM to nursery, majority of the farmers (99%) did not adopt recommended practices like length of cuttings, number of healthy buds/cutting, spacing and fertilizer application. Further, 37.33% of farmers did not attach any priority to the variety of mulberry planted by them and 81 and 52% did not adopt plant protection measures and recommended spacing for mulberry, respectively.

Elumalai and Murugesh (2019) opined that knowledge and adoption levels of the mulberry and silkworm rearing technologies among the marginal farms were found higher when compared to small farms and so also with large farms, the adoption level of silkworm rearing technologies in respect of silkworm race and shoot rearing were found to be encouraging. However, majority of the sample farmers had knowledge of bed cleaning in marginal farms but practically not followed.

The current study inferred that, large group of farmers in the study area possess full knowledge on mulberry production practices over partial and no knowledge levels. On the other hand, majority of the farmers partially adopted the mulberry production practices when compared to full and non-adoption levels. In this regard, concerted efforts must be made by the

extension personnel to adopt the mulberry production practices among the farmers to enhance the production and productivity of mulberry.

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