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A methodology to measure appropriateness of silkworm rearing technologies adopted by the farmers

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ABSTRACT
The extent of adoption of silkworm rearing technologies released since one decade was ascertained in purposively selected Kolar district. The paired comparison technique was applied and selected three silkworm rearing technologies. In each of Kolar and Sidlaghatta taluks with highest area under mulberry, four villages were randomly selected. All the adopters of the selected technologies constituted the respondents for the study. To measure the appropriateness of the preferred silkworm rearing technologies, 24 attributes were collected from review of past researchers. These attributes were listed under each technology with three-point continuum and the questionnaires were administered to 138 judges. The total scores for each and every attribute for three technologies were arrived separately based on the reports of the judges. The total scores for all attributes for every respondent were also arrived at. The mean ($\overline{X}$) scores for all the respondents and the population mean (μ) were also calculated. The critical difference (CD) method was computed for retaining or deleting the attributes of the particular technologies. The reliability and content validity were ensured in the instrument. The graphic rating scales were developed for all the relevant attributes of three technologies. The scores of 1, 2 and 3 were assigned to the three point continuum based on positive and negative nature of the attributes. Farmers' response was taken on three point continuum for each technology. Scores were assigned accordingly and subsequently Mean Appropriate Score (MAS) was computed. The MAS of all the selected technologies for each individual were further averaged to arrive at overall MAS of the silkworm rearing technologies for each farmer. The overall MAS and MAS for the silkworm rearing technologies were subjected to range and three categories appropriateness were made.

Key words : Appropriateness, Silkworm Rearing Technologies, Attributes, Adoption.

INTRODUCTION

Sericulture in India is getting modernized since last one decade due to sustained emergence of new technologies and also extension activities for its spread. When the new technologies released, it is assumed that they possess all the desirable characteristics facilitating adoption. On the contrary, when the farmers do not adopt technology to the desired extent, the blame is vested on the farmers. The fact, that the attribute of the new technology is perceived by the potential adopters is more important than the scientists. This aspect is seldom explained as to how the farmers have perceived the technology as appropriate in relation to its attributes to their condition.

The concept of appropriate technology is yet to be fully crystallized in the field of Sericultural technology in particular and agricultural technology in general. Though a serious need for such a research has been realised, the attempts in this direction were very few *viz.,* Nayudamma (1973), Ravishankar (1978), Niranjana Kumar (1979) and Ramegowda (1991). These methods appears to be lacking scientific sophistication in determining the appropriateness of a particular technology. It appears that much research lag is observed in determining the appropriateness of technology to the farmers conditions. Keeping this in view, the present study was conducted to develop a methodology to measure appropriateness of silkworm rearing technologies adopted by the farmers.

METHODOLOGY

Kolar district was purposively chosen for the study. All the silkworm rearing technologies released since one decade was considered and the extent of adoption of these technologies in the farmers' field was ascertained. The paired comparison technique Guilford (1971) was applied. Based on the highest scale values, three technologies *viz*., Shoot feeding for late-age silkworms, package of practices for chawki mulberry gardens and vijetha powder were selected.

Kolar and Sidlaghatta taluks were purposively selected based on highest area under mulberry. In each taluk, the villages having sericulture as main occupation were listed and from each village, all the adopters of selected technologies were identified. Finally, four villages from each taluk were selected randomly for making the total of eight villages. All the adopters of three technologies in the sample villages purposively constituted the respondents for the study.

To measure the appropriateness of the preferred silkworm rearing technologies, 24 attributes were collected from reviews of past researchers in the field and related ones, related text books like Barnett (1953), Lionberger (1960), Rogers (1962), Fliegel *et al.* (1968), Rogers and Shoemaker (1971), Ravishankar (1978), Niranjana Kumar (1979), Tornatzky and Klein (1981), Reddy *et al.* (1997) and Ganguly and Singh (1999), various research articles by extension specialists and discussion with the extension workers, researchers and progressive sericultural farmers.

All the 24 attributes were listed out under each preferred technology with a three-point continuum namely "highly applicable", "moderately applicable", and "least applicable" with weightages of 3, 2 and 1, respectively. To assess the degree of applicability of attributes for each technology, the questionnaires were administered to 138 judges in the sericulture field. They were requested to indicate their opinion by tick marking (ü) on one of the response categories of the three-point continuum against each attribute for every technology. The responses were obtained from 83 judges.

Total scores for each attribute for all the respondents under each technology were calculated. This procedure was followed in arriving at the total scores for each and every attribute for three technologies separately. The total scores for all the attributes for every respondent were also arrived at. The mean ($\overline{X}$) scores for all the respondents and the population mean (μ) were also calculated. The critical difference (CD) method was computed for retaining or deleting the attributes under a particular selected sericultural technology. If the deviation of attributes mean with population mean ($\overline{X}$ - μ) was equal to or greater than the value of critical difference for a particular attribute of a particular sericultural technology, that attribute was retained as significant The same procedure was followed for all the three technologies separately (Table 1,2 and 3).

To establish the reliability, the split half method was adopted. Highly significant correlation coefficient values (0.8896, 0.8678 and 0.8375) were achieved for all the instruments. Content validity was ensured for the instruments.

The graphic rating scales as suggested by Guilford (1971) for all the relevant attributes of three silkworm rearing technologies were developed (Scale-1, 2 & 3) and used to measure the

Table 1 : Standardized instrument to evaluate the appropriateness of "shoot feeding for late-age silkworms"

Sl. no.	Attributes	Mean	Rank	$\overline{X}$ - «
1	Initial cost	2.964	1	0.587*
2	Maintenance cost	2.289		-0.088
3	Saving of time	2.923	3	0.546*
4	Saving of discomfort	2.711	9	0.344*
5	Physical labour requirement	2.880	4	0.503*
6	Skilled labour requirement	1.241		-1.136
7	Profitability	2.928	2	0.551*
8	Immediacy of returns	1.072		-1.305
9	Regularity of returns	2.663	12	0.286*
10	Multiple use potential	1.277		-1.100
11	Local resource utilization	2.687	11	0.310*
12	Predictability	2.735	7.5	0.358*
13	Compatibility with previous experience	2.554	16	0.177*
14	Compatibility with existing practices	2.627	15	0.250*
15	Compatibility with existing implements	2.699	10	0.322*
16	Cultural compatibility	2.542		0.165
17	Physical compatibility	2.735	7.5	0.358*
18	Social approval	2.819	6	0.442*
19	Cognitive complexity	2.398		0.021
20	Use complexity	2.641	13	0.237*
21	Input complexity	1.157		-1.220
22	Riskness	1.048		-1.329
23	Trialability	2.639	14	0.262*
24	Observability	2.843	5	0.466*

Population Mean = 2.269 * = Significant at 5% level

Table 2. Standardized instrument to evaluate the appropriateness of "package of practices for chawki mulberry gardens"

Sl. no.	Attributes	Mean	Rank	$\overline{X}$ - «
1	Initial cost	2.831	1	0.568*
2	Maintenance cost	2.627	8.5	0.364*
3	Saving of time	1.277		-0.986
4	Saving of discomfort	1.145		-1.118
5	Physical labour requirement	2.663	6	0.400*
6	Skilled labour requirement	2.783	2.5	0.520*
7	Profitability	2.783	2.5	0.520*
8	Immediacy of returns	1.325		-0.938
9	Regularity of returns	2.639	7	0.376*
10	Multiple use potential	1.223	15.5	-1.034
11	Local resource utilization	2.494	13	0.231*
12	Predictability	2.542	14	0.279*
13	Compatibility with previous experience	2.518	12	0.255*
14	Compatibility with existing practices	2.554	5	0.291*
15	Compatibility with existing implements	2.687		0.424*
16	Cultural compatibility	2.398	11	0.135
17	Physical compatibility	2.590	4	0.327*
18	Social approval	2.711	15.5	0.448
19	Cognitive complexity	2.494	17	0.231*
20	Use complexity	2.482		0.219*
21	Input complexity	1.145		-1.118
22	Riskness	1.181	8.5	-1.082
23	Trialability	2.627	10	0.364*
24	Observability	2.602		0.339

Population Mean = 2.316 * = Significant at 5% level
Critical Difference = 0.173

Table 3 : Standardized instrument to evaluate the appropriateness of 'Bio-fertilizer Prakruthi' for silkworm rearing

Sl. no.	Attributes	Mean	Rank	$\overline{X}$ - «
1	Initial cost	2.855	2.5	0.930*
2	Maintenance cost	1.048		-0.877
3	Saving of time	1.325		-0.600
4	Saving of discomfort	1.602		-0.323
5	Physical labour requirement	1.349		-0.576
6	Skilled labour requirement	2.602	11	0.677*
7	Profitability	2.807	4	0.882*
8	Immediacy of returns	1.084		-0.841
9	Regularity of returns	1.422		-0.503
10	Multiple use potential	2.735	5	0.810*
11	Local resource utilization	1.181		-0.744
12	Predictability	2.723	6	0.798*
13	Compatibility with previous experience	2.711	7	0.786*
14	Compatibility with existing practices	2.651	9	0.726*
15	Compatibility with existing implements	1.120		-0.806
16	Cultural compatibility	1.229		-0.696
17	Physical compatibility	2.641	10	0.689*
18	Social approval	1.084		-0.841
19	Cognitive complexity	1.506		-0.419
20	Use complexity	2.699	8	0.774*
21	Input complexity	1.072		-0.853
22	Riskness	1.042		-0.877
23	Trialability	2.880	1	0.955*
24	Observability	2.855	2.5	0.930*

Population Mean = 1.776 * = Significant at 5% level

Critical Difference = 0.183

The Graphic Rating Scales to Measure the Appropriateness of Silkworm Rearing Technologies Adopted by the Farmers

Scale-1 : Check the appropriate cue on three point continuum which you perceived for each attribute of "Shoot feeding for late-age Silkworms" separately

Sl. no.	Attribute	Response of the farmers		
1.	Initial cost	Can affordable	Difficult to afford	Very difficult to afford
2.	Maintenance cost	Can affordable	Difficult to afford	Very difficult to afford
3.	Saving of discomfort	A great deal	Some extent	Little
4.	Physical labour requirement	High	Moderate	Least
5.	Profitability	Least	Moderate	High
6.	Regularity of returns	Very regular	Fairly regular	Least regular
7.	Local resources utilization	High	Moderate	Least
8.	Predictability	Least	Somewhat	Very much
9.	Compatibility with previous experience	High	Moderate	Low
10.	Compatibility with existing practices	High	Moderate	Low
11.	Compatibility with existing implements	Low	Moderate	High
12.	Physical compatibility	High	Moderate	Low
13.	Social approval	Quite a lot	Somewhat	Least
14.	Use complexity	Very much	Moderate	Least
15.	Trialability	Difficult	Moderate	Easy
16.	Observability	Least	Somewhat	Most

Scale-2 : Check the appropriate cue on three point continuum which you perceived for each attribute of "Package of practices for chawki mulberry gardens" separately

Sl. no.	Attribute	Response of the farmers		
1.	Initial cost	Can affordable	Difficult to afford	Very difficult to afford
2.	Maintenance cost	Can affordable	Difficult to afford	Very difficult to afford
3.	Physical labour requirement	High	Moderate	Least
4.	Skilled labour requirement	High	Moderate	Least
5.	Profitability	Least	Moderate	High
6.	Regularity of returns	Very regular	Fairly regular	Least regular
7.	Local resources utilization	High	Moderate	Least
8.	Predictability	Least	Somewhat	Very much
9.	Compatibility with previous experience	High	Moderate	Low
10.	Compatibility with existing practices	High	Moderate	Low
11.	Compatibility with existing implements	Low	Moderate	High
12.	Physical compatibility	High	Moderate	Low
13.	Social approval	Quite a lot	Somewhat	Least
14.	Congetive complexity	Very much	Moderate	Least
15.	Use complexity	Very much	Moderate	Least
16.	Trialability	Difficult	Moderate	Easy
17.	Observability	Least	Somewhat	Most

Scale 3 : Check the appropriate cue on three point continuum which you perceived for each attribute of "Vijetha powder" for silkworr rearing separately

Sl. no.	Attribute	Response of the farmers		
1.	Initial cost	Can affordable	Difficult to afford	Very difficult to afford
2.	Skilled labour requirement	High	Moderate	Least
3.	Profitability	Least	Moderate	High
4.	Multiple use potential	Very much	Moderate	Least
5.	Predictability	Least	Somewhat	Very much
6.	Compatibility with previous experience	High	Moderate	Low
7.	Compatibility with existing practices	High	Moderate	Low
8.	Physical compatibility	High	Moderate	Low
9.	Use complexity	Very much	Moderate	Least
10.	Trialability	Difficult	Moderate	Easy
11.	Observability	Least	Somewhat	Most

appropriateness. The response for each technology on the relevant attributes were obtained on three point continuum which indicated the degree to which it was perceived as favourable with respect to that attribute with the farmer as the point of reference.

Scores of 1, 2 and 3 were assigned to the three point continuum based on positive and negative nature of the attributes. The point on the extreme left on the scale for positive attribute and the point at the extreme right on the scale for negative attribute indicated the most favourable nature of the technology for the farmers' condition. Further, individual technologies subjected for assessing their appropriateness by using the specific attributes, which were relevant to the particular technologies for comparative analysis of attributes towards appropriateness of data were analysed accordingly. For each selected technology the farmers response was taken on three point continuum. Scores were assigned accordingly and subsequently Mean Appropriate Score (MAS) was computed. The MAS of all the selected technologies for each individual were further averaged to arrive at overall MAS of the sericultural technologies for each farmer. Further, the MAS and overall MAS for the sericultural technologies were subjected to range and the categories of appropriateness were made.

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