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TECHNOLOGY ADVANCEMENT AND ITS ADOPTION: A BOOSTER FOR SERICULTURE DEVELOPMENT AND EXPANSION IN MADHYA PRADESH, INDIA *(WITH SPECIAL REFERENCE TO BURHANPUR DISTRICT OF MADHYA PRADESH)*

Rahul A. Rathore[*1], Dr. Madulika A. Sonawane[2], Dr. Chandan Roy[3]

[1]Research scholar, Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon (MS)

[2]Associate Professor, Department of Management, Kavayitri Bahinabai Chaudhari North Maharashtra University, Jalgaon (MS)

[3]Associate Professor, Department of Economics, Kaliyaganj College, West Bengal.

*Corresponding Author

ABSTRACT

Sericulture, as an agro based artisanal industry, has proved its potential in raising sustainable income and employment in the rural sector of both traditional and non-traditional states of India. The entire gamut of production in sericulture generates huge economic growth for small villages and its inhabitants and restrict rural to urban migration. This study is based on primary data of sample size 50 which belong to the sericulture farmers and artisans in Burhanpur district of Madhya Pradesh, India. The paper analyzes their knowledge level on improved technology and the adoption level of this advanced technology in sericulture business. The knowledge of technology has found to have greater impact on improving the productivity and production in terms of agriculture as well as its allied activities. This study finds out significant positive impact of variables like, full and partial knowledge about advanced technology and its adoption on the development of the sector. Farmers' perception about 'high cost of technology adoption' and 'lack of awareness' are two chief reasons for their non-adoption of the technical advancement. So knowledge and adoption level of advance technology need to be synchronized and extended to base level, making it more cost efficient and easily available to poor farmers and artisans.

Keywords: Adoption level, Improved Technology. Knowledge Level, Sericulture,

JEL Classifications : O31, O35, Q16

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1. INTRODUCTION

Sericulture which involves both agriculture and industrial activities has proved to be an ideal vocation both for marginal as well as small farmers in raising their rural income as well as restrict the tendency of rural to urban migration. Sericulture, being a key labour intensive practice, involves farmers, semi skilled rural artisans in its extensive process of production of silk. In its vertical process of production starting from mulberry crop growing, rearing of silkworm for the production of cocoons, reeling of cocoons, spinning, drying, twisting of silk yarn and then weaving of silk fabrics, workers from different sections contribute and add value. The ultimate production of silk has high market demand throughout the world mainly because of its soft, glossy and natural texture.

India is second largest producer in raw silk in the world, after China. But so far as exports performance is concerned, India is lagging behind. Almost 85% of its production is domestically consumed which indicates India's supply side bottleneck too (EXIM Bank of India, 2002). The critical reasons are mostly the poor and the traditional technology used by the sericulturists. Hence, there is an essential need to improve and upgrade the technology for sericulture, which can only enhance the production and productivity of Indian silk and silk goods in the global market.

Sericulture has been technologically advanced since last three decades in India and progressive changes have been made both in traditional and non-traditional states. Numerous efforts have been made by research and development sections of CSB (Central Silk Board). Besides updating the technology for improvement in production and quality, CSB monitors and controls all the activities for the growth and development of sericulture in India. There have been ongoing researches done in different fields like, mulberry variety, disease management problems, methods of seeds for plant cultivating, water management issue and different rearing practices. However, even today the extent of knowledge and adoption level of improve technology is not up to the mark which results in low quality as well as decline in production of cocoons and the raw silk. Our primary survey in Burhanpur district of Madhya Pradesh state of India focuses on the extent of knowledge and adoption level that exists in different sericulturist farmers in study area. Another objective of this study is to find out the key issues and reasons for not adopting the improvised technology and keep on following the conventional practices.

2. OBJECTIVES OF THE STUDY

The specific objectives of this study can be categorized as follows:

A. To find out 'knowledge level' and 'technology adoption level' of sericulture farmers and artisans.

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B. To analyse view of both, 'knowledge level' and 'adoption level' of sericulturists in response to improved technology.
C. To find out the specific reasons behind non-adoption or partial adoption of improved technology by the sericulture farmers and artisans.

2.1 Research Methodology of the Study

The study was proposed to be conducted in Burhanpur district of Madhya Pradesh, which is a non-traditional Indian state in silk production. In this primary survey, 10 villages were chosen from the district using stratified random sampling method. From every chosen village 5 respondents were selected using simple random sampling method. Both primary and secondary data were used for deducing the final outcomes of the present research paper. In primary survey, data was collected using 'interview schedule' in order to understand the extent of knowledge and adoption level of farmers. Likert method was used for finding the key reasons for not adopting the advanced technologies by sericulture farmers and artisans. The questionnaire is structured with the help of statistical tools like mean and percentage method was used for analyzing the data.

In assessing the level of implemented technology, following factors are taken into consideration viz, yielding varieties, paired row system, compost application, irrigation management, intercropping system, training and pest and disease control methods for mulberry cultivation. For silkworm rearing variables like Chawki garden and rearing house, technique of late age rearing, bed disinfectants, disinfection for rearing house, shoot rearing method, disease management and time management for cocoon harvesting were taken into consideration in detecting the level of technology.

2.2 Limitations of the study

a. Further variables related to improved technology for Mulberry cultivation and Silkworm rearing could be added for the purposes of detail study.
b. The study is restricting to limited geographical area.

3. BACKGROUND OF THE STUDY

Sreenivasa and Hiriyanna's study (2014) in Chitradurga district of Karnataka indicate that the 'technology adoption level' is dependent on the variable factors like extension participation, experience, age and education and that directly affect the cocoon yield and its price. Another related study conducted by Seenappa, Devakumar and Manjula (2016) revealed that there is a significant affect of different methods and levels of irrigation on quantity and quality of mulberry leaves. Vijaya Kumari and Rajan (2015) in their study identified that there was an improvement

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in knowledge level of sericulture artisans due to the training provided by Chawki Rearing Centre (CRC) regarding different technologies related to mulberry garden management and silkworm rearing. This also resulted in the improvement in adoption level which led us to conclude that the training and awareness program improve the knowledge level for adopting improved technology.

In another study on adoption of technology in integrated pest management (IPM) practices Sakthivel et. al.(2012) constructed Technology Gap Index (TGI) to calculate the percentage difference between recommended score, R and actually adopted score, A.

TGI= (R-A /A)*100

TGI values higher than 75 is considered to be high technological gap, while TGI less than 40 is considered to be low gap. The study revealed biological control measures against pest management in sericulture was bearing highest technological gap (87.60%).

Jayaram (2010) stated that a socially dynamic and motivated peer group would always respond better to the new ideas than a group which is not activated enough. Education and extension service play a crucial role in making the dynamic peer group adopt new ideas. However, adoption of technology by the farmers essentially is a decision making process which depend upon combination of several factors (Ray, 1991), while adoption of technology is often considered to be a vertical integration of five process, e.g., Awareness, Interest, Evaluation, Trial and Adoption. Regular communication between researchers and extension agencies can help to ensure the successful transfer of new technology to end user. In West Bengal, it has been observed that education level of sericulture farmers are inversely affected the level of average employment in this artisanal industry, which means sericulture is popular among poor and uneducated farmers (Roy and Roy Mukherjee, 2015). This particular criterion seems to be true for other states too and keep the technology outside the periphery of silk farmers and artisans.

In India, adoption of new technology lifted into new heights after introduction of high yielding mulberry variety (Krishnaswami, 1986) after 1972, which was followed by introduction of robust bivoltine silkworm races. Following the recommendations of package and practices of mulberry cultivation, a large number of sericulturists was enabled to raise their mulberry yield from an average of 15,000 Kgs/ha to 30,000 Kgs/ha. In 2011, Government of India has launched JICA (Japanese International Cooperative Agency) for the development of bivoltine sericulture. Due to various advents of these technologies sericulture has been extended in non-traditional states of India.

Our chosen survey region is also one non-traditional state, i.e., Madhya Pradesh, where sericulture was started in 1955 with the establishment of few mulberry centres within the district of Indore. Initially there were only 10 silk centres and over a period of ten years the number of

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silk centres augmented to 70 in seven districts. By the end of 1960, the extension activities in the sericulture sector were tagged with IRDP (Integrated Rural Development Programme) and sericulture farmers were involved in mulberry cultivation and silkworm rearing. These endeavours were further accentuated while a separate Directorate of Sericulture was established in 1984. At present sericulture is practiced in almost all the 41 districts of Madhya Pradesh and mulberry raw silk is produced in all the districts, while only 24 districts produce non-mulberry raw silk along with mulberry silk. The state produces 71 MT of bivoltine raw silk and 14MT of Cross Breed raw silk in 2017-18 cultivating in 2765ha area of land (CSB, 2019). Currently the state consists of 125 sericulture villages where 24248 sericulture farmers are working with 534 silk-reelers. Within the forty one districts we have chosen Burhanpur using stratified random sampling to represent the average common scenario of sericulture in Madhya Pradesh. Burhanpur is the 9th largest silk producing district in the state, which is a mid-size district in the state of Madhya Pradesh.

4. DATA ANALYSIS

Structured questionnaire was prepared for the respondents highlighting the research objective and the questionnaire was distributed among the sericulture farmers and reelers on simle random sampling basis. After receiving the answers from the respondents the data was cleaned and tabulated in several formats as follows.

56 questionnaires were distributed among the respondents and ultimately 50 questionnaires were accepted for analysis. Thus the sample size of this survey is 50 Sericulture farmers and reelers.

4.1 Result & Discussion: Knowledge level for mulberry cultivation and silkworm rearing Technologies:

Mulberry cultivation: The study based on three variables 'full, partial and no knowledge level' for improved Technologies. The result (Table No.2) revealed that 38% of sericulturist having full knowledge for irrigation management and vermi composting and paired row system. Data also indicate that a large share of farmers (52%) have partial knowledge about vermi composting, while 50% respondents have partial knowledge on planning of nursery bed and the executions, while 48% have partial knowledge about compost application and irrigation management.

The study also finds that 52% of farmers having no knowledge about pest and disease control method, which is considered to be an important aspect for protecting mulberry plant and thereby raising production and income which would improve the numbers of sericulturist farmers to expand sericulture as a subsidiary business. 44% are found to have no knowledge on intercropping framework system and 26% of the farmers have no knowledge about pruning and training schedule.

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Silkworm rearing: Primary data reveal that 48% of the respondents have full knowledge for separate Chawki garden and house followed by 44% of the respondents who have full knowledge about disinfection of rearing appliances and rearing house. 48% respondents have knowledge about cocoon harvesting time, followed by 40% respondents who have partial knowledge about Chawki Garden and rearing house separately, while 38% of the respondents have partial knowledge regarding early stage rearing, shoot rearing method, silk worm disease management and biological control of uzi fly. Unfortunately, 40% of sericulturist are having no knowledge about silkworm disease management and biological control of uzi fly which are supposed to be the critical aspects for silk rearing, and 32% of the respondents have no knowledge about the early stage of chawki rearing.

4.2 Result & Discussion: Technology Adoption Level for mulberry cultivation and silkworm rearing Technologies:

Mulberry cultivation: The results (shown in Table No.2) indicate that 42% of the respondents have fully adopted vermi composting as a good source of nutrition for soil which would improve the production of Mulberry. Then, 40% of the respondents have adopted technologies for intercropping framework system. Both these activities are related with each other because vermicompost helps the land to be more fertile and thus provides a base for intercropping of crops. This technology adoption helps to generate more remuneration to the farmers in the survey region. In partial adoption level of technology parameter, the highest number of respondents who partially adopted fertilizer complication as per the environmental condition is 60% followed by 52% of the respondents who partially adopted high yielding varieties according to condition. Again 44% of the respondents have not at all adopted proper irrigation management as well as effective pest and disease control techniques which are the essential aspects for expansion of sericulrure.

Silkworm rearing: The result for adoption of rearing technologies is that 32% has adopted the technology of disinfection of rearing appliances and rearing house and also for cocoon harvesting and deflossing. For partial adoption level 46% of sample partially adopted for shooting method and also for biological control of uzi fly, while 38% of sericulturists partially adopted technique of late age rearing and spacing.

But the more striking part is that 56% of respondent has not adopted new technology for Chawki Garden and rearing house which is essential and core part for silkworm rearing, while 52% of sericulturists did not adopt technology for silk worm disease management which is inevitably related to the separate rearing house because it reduces the silk worm disease and 42% of sericulturists did not adopt technique of late age rearing and spacing.

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4.3 Reasons for Partial and Non-adoption of improved Technology:

Our field study in Burhanpur district reveals that 38% strongly agree and 42% respondent agree that high cost for adopting this technology is one of the chief reasons for technological backwardness in sericulture. On the other hand, 32% respondents strongly agree and 44% agree that lack of awareness acted as a stumble block in technological advancement in sericulture. Other findings are as follows:

1. 52% of silk-farmers having no knowledge about pest and disease control method and 56% have not adopted chawki garden and rearing house while 52% of silk growers do not have advance knowledge on silk worm disease management
2. The most vital factor about 'Knowledge and Adoption level' for improved technology is that there is lack of awareness programs and inflexible training curriculum. This key factor identifies that knowledge level is independent and adoption level is dependent on extent of knowledge and thereby completely dependent on knowledge level of sericulturists farmer.
3. The critical reasons for non adoption of improved technology in the study region are silk farmers' perception about high cost for technology adoption and lack of awareness regarding improved/updated technology in study region.

5. CONCLUSION

The study revealed that 32% of sericulture farmers have full knowledge level and 22% of sericulture farmers have partial adoption level regarding updated technology. Similarly for technology adoption level 42% sericulture farms have full knowledge, while 13% have no knowledge regarding updated technology and 36% of silk farmers are not adopting upgraded technology. Therefore it can be inferred that knowledge level and technology adoption need to be synchronized and extended to the base level. Technology has to be cost efficient too, so that poor farmers can easily avail them. A Peer group can be made to disseminate the updated technical knowledge to the silk farmers and growers. Different awareness training program can be equally helpful which would include the associated factors. These factors have to be fundamental, critical, significant and exhaustive for creating an overall awareness regarding the knowledge of improved technology of silk farmers and growers. Then we can hope for a rapid boost up in the sericulture sector of Madhya Pradesh in days ahead.

REFERENCES

B. T. Sreenivasa & Hiriyanna. "A study on the factors influencing adoption of new technologies in nontraditional sericultural area of chitradurga district, Karnataka." *G.J.B.A.H.S.*, Vol.3 (1):239-243. (January – March,2014).

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Battula Sujatha, Pyinti L. Reddy, Madduri A.S. Babu, Bheemireddy A. Reddy, Pasupula S. Kumar, Sapavathu S. Naik. "Socio-economic factors influencing the adoption levels of new sericulture technologies by different farming groups in Anantapur District of Andhra Pradesh". *Int. J. Agr. Ext.* 03 (02) 2015. 149-153.

C. Seenappa, N. Devakumar and N. Manjula. "Quality and Quantity of Mulberry Leaf Influenced By Different Methods, Levels of Irrigation and Mulching During Rabi in Eastern Dry Zone of Karnataka." *International Journal of Applied and Pure Science and Agriculture*. Volume 02, Issue 07, July- 2016.

EXIM Bank of India. "Indian Silk Industry: A Sector Study", Occasional Paper No. 90. Quest Publications, March,2002.

Hadimani, D.K., Moulasab, J. Ashoka and Manjunath. "An Impact Study on Sericulture Production Technologies by the Farmers of Bidar District in Hyderabad Karnataka" *Int. J. Curr. Microbiol. App. Sci*. 6(11). 2017 doi: https://doi.org/10.20546/ijcmas.2017.611.280

Jayaram, H. "Impact of Technological Change in Sericulture: A Case Study in Karnataka", Ph.D. Thesis submitted in University of Mysore, 2010. Accessed in http://hdl.handle.net/10603/11142 on 1.5.2019.

K.M. Vijaya Kumari and R.K.Rajan. "Impact of training on knowledge and adoption levels of Chawki rearing centre owners of Karnataka state", *Agric. Sci. Digest.,* 35 (3) 2015: 203-206.

Krishnaswami, S. "Mulberry Cultivation in South India", *Central Silk Board, Bangalore,* 1986.

Mir, M.A., Baqual, M.F. and Hussan, F., "Study on Technology Adoption by Silkworm Rearers in Kashmir", *Int. J. Pure App. Biosci.* 6(1): 313-317 (2018). doi: http://dx.doi.org/10.18782/2320- 7051.6068

Mohd. Ashraf Mir, "Studies on the impact of adoption of sericulture technologies on cocoon production and productivity in Kashmir", PhD Thesis submitted to Sher-e-Kashmir University of Agricultural Sciences & Technology of Kashmir ,2013.

Rahul A Rathore and Dr. Madulika A. Sonawane., "Comparative Study among Women's and Men's Agripreneurship skills in Sericulture with respect to Burhanpur District." *RESEARCH JOURNEY International Multidisciplinary E- Research Journal.* ISSN: Jan.2019. www.researchjourney.net

ISSN: 2455-8834

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Ray, G.L. " Extension, Communication and Management", *Naya Prokash, Calutta,* 1991, p.109.

Reddy, A. Adivi. "Extension Education", *SriLakshmi Press, Andhra Pradesh,* 1993, pp.277-85.

Roy, Chandan and Roy, Mukherjee, Sanchari. "Issues of Productivity, Employment and Exploitation in Artsanal Silk Industry of West Bengal, *Indian J Soc. Nat. Sci,* 2015, Vol.4, p.47-64.

Sakhtivel,N.,Kumaresan, P., Qudri, S.M.H., Ravikumar, J. and Balakrishna, R. "Adopted of Integrated Pest Management Practices in Sericulture- A Case Study in Tamil Nadu", *J. Biopost,5 (Supplementary)*,2012, p.212-215.

Todmal, S.B., Khalache, P.G., Gaikwad, J.H.and Jadhav, R.M. "Constraints faced by the sericulturists in adoption of sericulture production technology", *Adv. Res. J. Soc. Sci.,* 4 (1) : 2013, p.112 - 114.

4.4 Figures

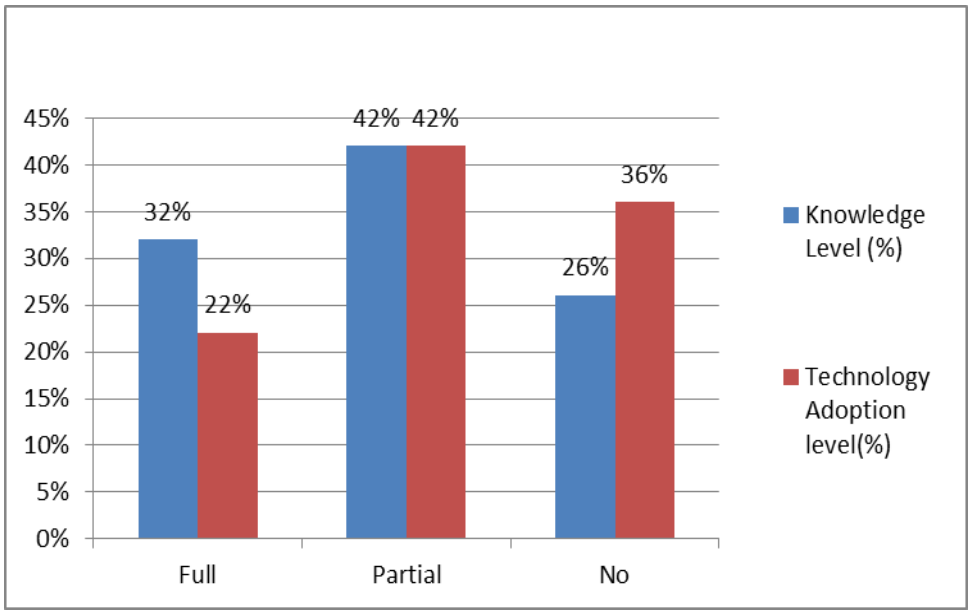

Figure 1: Knowledge & Technological Adoption Level (Full, Partial, No)

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4.5 Tables

Table 1: Information of questionnaire

Questionnaire distributed	Questionnaire received	Questionnaire rejected (due to incomplete, wrongly filled etc)	Net Sample size for study
56	**50**	**06**	**50**

Table 2: Knowledge and Technological Adoption Level

Name of Improved Technology	**Knowledge Level**			**Technology Adoption level**		
Activities	***Full%***	***Partial %***	***No %***	***Full%***	***Partial %***	***No %***
A. Mulberry cultivation Technologies						
1. High yielding varieties according to region	17 (34%)	22 (44%)	11 (22%)	5 (10%)	26 (52%)	19 (38%)
2. Appropriate Paired row system/wider spacing	19 (38%)	23 (46%)	8 (16%)	9 (18%)	21 (42%)	20 (40%)
3. Compost application as per ecological condition	16 (32%)	24 (48%)	10 (20%)	7 (14%)	30 (60%)	13 (26%)
4. Vermi composting	19 (38%)	26 (52%)	5 (10%)	21 (42%)	12 (24%)	17 (34%)
5. Planning of nursery bed and the executives	16 (32%)	25 (50%)	9 (18%)	11 (22%)	19 (38%)	20 (40%)
6. Appropriate Irrigation course of action	19 (38%)	24 (48%)	7 (14%)	10 (20%)	18 (36%)	22 (44%)
7. Intercropping framework	12 (24%)	16 (32%)	22 (44%)	20 (40%)	19 (38%)	11 (22%)
8. Pruning and training schedule	18 (36%)	19 (38%)	13 (26%)	8 (16%)	25 (50%)	17 (34%)
9. Effective pest and disease control Method	12 (24%)	12 (24%)	26 (52%)	10 (20%)	18 (36%)	22 (44%)
B. Silkworm rearing Technologies						
1. Separate Chawki garden and rearing house	22 (44%)	22 (44%)	6 (12%)	6 (12%)	16 (32%)	28 (56%)
2. Early stage (Chawki) rearing	15 (30%)	19 (38%)	16 (32%)	13 (26%)	18 (36%)	19 (38%)
3. Technique of late age rearing & spacing	18 (36%)	18 (36%)	14 (28%)	10 (20%)	19 (38%)	21 (42%)

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4. Routine with regards to bed disinfectants	15 (30%)	24 (48%)	11 (22%)	14 (28%)	18 (36%)	18 (36%)
5. Disinfection of rearing appliances and rearing house	17 (34%)	23 (46%)	10 (20%)	16 (32%)	15 (30%)	19 (38%)
6. Shoot rearing method	16 (32%)	21 (42%)	13 (26%)	7 (14%)	23 (46%)	20 (40%)
7. Silkworm disease management	11 (22%)	19 (38%)	20 (40%)	8 (16%)	16 (32%)	26 (52%)
8. Biological control of Uzi fly	11 (22%)	19 (38%)	20 (40%)	7 (14%)	23 (46%)	20 (40%)
9. Time of cocoon harvesting and deflossing	15 (30%)	22 (44%)	13 (26%)	16 (32%)	15 (30%)	19 (38%)

Table 3: Findings on Knowledge & Technology Adoption Level

	Knowledge Level	Technology Adoption level
Full	16 (32%)	11 (22%)
Partial	21(42%)	21 (42%)
No	13(26%)	18 (36%)
TOTAL	50(100%)	50 (100%)

Table 4: Reasons for Non-Adoption of Advanced Technology & Sericulture Farmers' Response

S.No	Reasons for non-adoption of improved technology	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
1	High cost for adopting technology	19 (38%)	21 (42 %)	2 (4 %)	6 (12 %)	2 (4 %)
2	Lack of awareness about technology	16 (32 %)	22 (44 %)	0 (0 %)	7 (14 %)	5 (10 %)
3	High risk of adopting improved methods	15 (30 %)	17 (34 %)	3 (6 %)	9 (18 %)	6 (12 %)
4	Lack of training	15 (30 %)	20 (40 %)	2 (4 %)	8 (16 %)	5 (10 %)
5	Stick or go with traditional pattern	13 (26 %)	11 (22 %)	1 (2 %)	16 (32 %)	9 (18 %)