Technological Gap in Adoption of Cultivation Practices by Bamboo Growers

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ABSTRACT

A study was conducted on technological gap in adoption of cultivation practices by bamboo growers in Nagpur district of Maharashtra by following the purposive sampling methods. Total 120 bamboo growers from 24 villages were selected. An exploratory research design was used for study. The finding revealed that 75.00 per cent of bamboo growers had medium technological gap, followed by low (18.33%) and high (06.67%) technological gap in adoption of bamboo cultivation practices. Among the various improved technologies, the highest technological gap was observed in adoption of Application of fungicide (Carbendazim powder solution) (72.08%) followed by Ideal spacing for farm boundary plantation (69.16 %), Irrigation schedule (68.75%), Use of side branches (67.91%), best season and fertilizer application (67.50%), application of insecticide (66.66 %), use of cutting tools (66.66%),bamboo suitable species for fencing (63.75%), height of cutting (50.00%),selection of seedlings variety (48.33%), pit mixture (48.33%), disease management (47.50%), Suitable species for vidarbh (46.66%), type of soil (43.33%), time of pruning (43.33%), harvesting time (39.16%), planting time (37.08%), ideal spacing for agroforestry plantation (36.66%), suitable intercrops in kharif season (35.83%), pit size for planting (35.41%), method of cutting (34.58%), intercrop in rabi season (34.16%), time of application of fertilizers (31.25%) and age of cutting bamboo (26.66%). Whereas, age, land holding, annual income, area under bamboo cultivation is non-significantly associated with overall technological gap. Majority of the respondents faced constraints in adoption of recommended technologies for bamboo cultivation practices like non-availability and high labour charge for planting and cutting of bamboo (76.66%), lack of protection (70.83%), lack of market facilities in the village (70.00%), high cost of input (69.16%), high cost of fertilizer (64.16%), low price for the produce (54.16%), lack of technical guidance regarding cultivation (48.33%),

Keywords: *Technological Gap, Adoption, Cultivation Practices, Bamboo Growers*

INTRODUCTION

Bamboo, a woody grass from the family Poaceae or Gramineae, sub family Bambusoideae, is a versatile resource worldwide. The fastest growing plant can attain 40 m height and 30 cm diameter in four months (Troya and Xu, 2014). Bamboo is an important livelihood crop and material for rural people living in Asia, Latin America and Africa. Almost half the world population use bamboo in one form or other (Rao and Sastry, 1996). Bamboo and its parts are utilized by various cultures to deliver the products and services essential to their way of life.

Economically, bamboo provides multiple benefits. It is an excellent substitute for wood in paper industries, domestic commodities, cottage industries, board and charcoal (Lobovikov et al., 2007). Owing to its quality and strength, bamboo reduces the use of timber consumption in construction (Atanda, 2015). The people of Asia, Africa and South America use bamboo poles for house construction and agricultural implement. Bamboo shoots are eaten as vegetable in South-East and East Asian countries (Troya and Xu, 2014).

However there is still a wide gap between the

production potential and the actual production realized by the bamboo growers. This may be due to partial adoption of improved cultivation practices by bamboo growers. Technological gap is a major problem in increase bamboo production. No systematic effort was made to study the technological gap existing in various components of bamboo production. Therefore, the present study was undertaken with following objectives.

OBJECTIVES

1. To study the technological gap in adoption of bamboo cultivation practices
2. To study the relationship between selected characteristics of bamboo growers and their technological gap
3. To identify the constraints faced by the bamboo growers in adoption of the recommended cultivation practices

METHODOLOGY

Nagpur district is comprised of fourteen talukas. Out of these 14 talukas , eight talukas namely Bhivapur, Umred, Saoner, Nagpur rural, Hingna, Katol, Ramtek and Kalmeshwar was purposively selected for the study as they have maximum area under bamboo cultivation. Total 24 villages were purposively selected as they have maximum area under bamboo cultivation. From each selected villages, 5 farmers were purposively selected who having minimum one acre of land under bamboo cultivation. Hence, total sample size was 120 farmers. The data were collected in the light of the objectives of the study with the help of well-structured interview schedule by personal approach. The technological gap refers to the gap between the recommended package of practices and practices actually applied in farming. The formula used for measuring the technological gap was as follows.

$$\text{Technological gap index} = \frac{R-A}{R} \times 100$$

Where,

R = Recommended score for each practice

A = Adoption score of relatives practices

RESULTS AND DISCUSSION

Technological gap in different components of improved bamboo cultivation practices

The average technological gap in adoption of different component of improved bamboo cultivation practices among the bamboo growers are summarized in Table-1.

Table 1
Technological gap index in different components of recommended bamboo cultivation practices

Sr. No.	Recommended practices	Technological gap index
1	Type of soil (Well drained, Medium to deep)	43.33
2	Bamboo suitable species for vidarbha (Tulda, Balcooa, Managa, Katang, Asper, Olivary)	46.66
3	Bamboo suitable species fencing (Manvel, Katang, Tulda)	63.75
4	Ideal spacing for agroforestry plantation (8 x 2, 7 x 2.5 Mt.)	36.66
5	Ideal spacing for farm boundary plantation (2 X 2 Mt.)	69.16
6	Suitable intercrops Kharif: Soybean, Sesame, Mug	35.83
	Rabbi: Jawar, Gram	34.16

7	Selection of seedlings (Seedling height: 3 ft Avoid naked seedlings)	48.33
8	Best month for rainfed planting (June / July)	37.08
9	Best season for irrigated planting (Winter)	67.50
10	Pit size for planting uncultivated / waste lands: 2 x 2 Ft Cultivated / agriculture lands: 1 x 2 Ft	35.41
11	Pit mixture Good soil + FYM (1:1) ratio	48.33
12	Application of fungicide (Carbendazim powder solution)	72.08
13	Application of insecticide (Chlorpyriphos, quilolphos)	66.66
14	Fertilizer application 100:50:50 (NPK)	67.50
15	Time of application of fertilizers (Avoid application in rainy days)	31.25
16	Irrigation schedule (Rainy season: No irrigation, Winter season: Once in month Summer once in week)	68.75
17	Time of Pruning (February - mon(h)	43.33
18	Disease management (Shoot rot)	47.50
19	Age of cutting (No cutting up to three years Start cutting in fourth year)	26.66
20	Method of cutting (Horseshoe cut of crosscut)	34.58
21	Use of cutting tools (Hand saw, power saw, pole pruner)	66.66
22	Height of cutting (Cutting from base above one or two node)	50.00
23	Harvesting time (December to April)	39.16
24	Use of side branches (Compost making, making of charcoal)	67.91
25	Yield (10 to 20 ton/ha)	53.33
	Technogical gap index	**50.06**

It was observed from Table 1 that, majority of the respondents had technological gap regarding application of fungicide (Carbendazim powder solution) (72.08 %), ideal spacing for farm boundary plantation (69.16%), irrigation schedule (68.75%) and use of side branches (67.91 %), respectively

Similar percentage of respondents (67.50%) had technological gap in best season for irrigated planting(winter) and fertilizer application (NPK).

Where as 66.66 per cent of respondents had technological gap regarding application of insecticide and use of cutting tools followed by 63.75 per cent in bamboo suitable species for fencing.

It is observed from the findings 53.33 per cent of the respondents had technological gap in yield of bamboo followed by height of cutting (50.00%) and similar percentage of the respondents (48.33%) had technological gap regarding selection of seedlings and pit mixture.

It was revealed that, 47.50 per cent of respondents had technological gap regarding disease management and suitable species for vidarbh (46.66%). Where as similar percentage of respondents (43.33%) had technological gap regarding type of soil and time of pruning .

Further study observed from the findings that, comparatively low technological gap were found regarding harvesting time (39.16 %), planting time (37.08%) , ideal spacing for agroforestry plantation (36.66%), suitable intercrops in kharif season (35.83 %), pit size for planting (35.41 %), method of cutting (34.58%), intercrop in rabi season (34.16%) and time of application of fertilizers (31.25%), respectively.

It is concluded from the findings that, very low respondents (26.66%) found technological gap regarding age of cutting bamboo.

The overall technological gap combining all the recommended practices together was 50.06 per cent of the total improved bamboo cultivation practices as expressed by the bamboo growers.

The possible reason for these might be that majority of the bamboo growers were unaware about many practices. Further, due to many reasons like lack of knowledge and technical guidance, wildlife attack, lack of finance, high cost of chemical fertilizers and insecticides and shortage of labour were their limitations and hence they could not adopt many improved bamboo cultivation practices. Dilipkumar and Venkatram (2018) & Handique (2011).

Overall technological gap about bamboo cultivation practices

The technological gap refers to the difference between technology recommended by the scientists and technology adopted by the farmers. It was felt that agricultural technology is not generally adopted by the farmers completely in all respects. As a result, technological gap appears and poor yield is obtained. Keeping this in view, technological gap has been studied. On the basis of score obtained by the bamboo growers, technological gap were grouped into three categories viz., low, medium and high . The data regarding this aspect are presented in Table 2.

Table 2.
Distribution ofbamboogrowersaccordingtotheiroverall technological gap

Sr. No.	Category	Respondents (n = 120)	
		Frequency	Percentage
1	Low (Up to 33.33)	22	18.33
2	Medium (33.34 to 66.66)	90	75.00
3	High (Above 66.66)	08	06.67
	Total	**120**	**100.00**
	Mean = 60.12		

The data in Table-2 clearly indicate that 75.00 per cent of bamboo growers had medium technological gap, followed by low (18.33%) and high (06.67%) technological gap in adoption of improved bamboo cultivation practices, respectively.

The possible reasons for this might be that the farmers could not get the message of improved cultivation practices in time in acceptable form. Further, farmers might have tried their best to use and adopt the improved bamboo cultivation practices but some constraints might have hindered them to do so, and hence technological gap might have observed. (Patel et al (2014)

Relationship between personal, socio-economic, communication and psychological characteristics of bamboo growers with their technological gap

The specific objective of the present investigation was to study the association between selected personal, social, economic, communication and psychological characteristics of the respondent bamboo growers and their extent of overall technological gap.

The correlation test was used to ascertain their association between technological gap and the selected independent variable. The results are presented in the following Table 03.

Table 03
Correlation coefficients between independent characteristic and technological gap in bamboo cultivation

Sr. No.	Independent variable	Correlation coefficient
1	Age	-0.1382^{NS}
2	Education	-0.1891*
3	Land holding	-0.0929^{NS}
4	Annual income	-0.1017^{NS}
5	Area under bamboo cultivation	-0.1365^{NS}
6	Bamboo farming experience	-0.1881*
7	Training received	-0.1643*
8	Source of information	-0.1492*
9	Innovativeness	-0.2162**
10	Economic motivation	-0.1774*
11	Knowledge	-0.3287**

** Significant at 0.01 level of probability
* Significant at 0.05 level of probability
N.S. – non significant

It is depicted in Table 03 that the innovativeness and knowledge were found negative and highly significant with technological gap at 0.01 per cent level of probability, whereas education, bamboo farming experience, training received, source of information and economic motivation had negatively significant with technological gap at 0.05 per cent level of probability hence, null hypothesis (H0) is rejected in this case.

The variable age, annual income and area under bamboo cultivation were found non-significant relationship with technological gap hence, null hypothesis (H0) is accepted in this case.

Constraints in adoption of bamboo cultivation practices by the bamboo growers

The constraints faced by respondents in adoption of recommended groundnut cultivation practices were as ascertained by researcher. The problems related to various aspects of technological gap in recommended bamboo cultivation practices by farmers were identified by obtaining response of individual respondent. The relevant data in this regard has been presented in Table 04.

Table 04
Distribution of respondents according to the constraints faced by them in adoption of recommended bamboo cultivation practice

Sr. No.	Constraints	Respondents (n=120)		Rank
		Frequency	Percentage	
1	Non-availability and high labour charge for planting and cutting of bamboo	92	76.66	I
2	Lack of protection (Wildlife attack)	85	70.83	II
3	Lack of market facilities in the village	84	70.00	III
4	High cost of input	83	69.16	IV
5	High cost of fertilizer	77	64.16	V
6	Low price for the produce	65	54.16	VI
8	Lack of technical guidance regarding cultivation	58	48.33	VIII

The data presented in table 04 revealed that, majority of the respondents faced constraints such as non-availability and high labour charge for planting and cutting of bamboo (76.66%), lack of protection (70.83%), lack of market facilities in the village (70.00%), high cost of input (69.16%), high cost of fertilizer (64.16%), low price for the produce (54.16%) and lack of technical guidance regarding cultivation (45.83%), were reported constraints in adoption of recommended bamboo cultivation practice.

Summing up the constraints analysis it is concluded that most of these practices are not adopted because of non-availability and high labour charge for planting and cutting of bamboo, lack of technical guidance, wildlife attack, high cost, unavailability of improved variety of bamboo and lack of knowledge about these practices. It is necessary to overcome these constraints to increase awareness and knowledge recommended bamboo cultivation practices by the respondents. Bagdi et al. (2013).

CONCLUSION

It can be concluded that majority of the responded (75.00%) belonged to medium level of technological gap, followed by low (18.33%) and high (06.67%) technological gap in adoption of improved bamboo cultivation practices, respectively. The present study indicated that more technological gap observed in the Application of fungicide (72.08%) followed by Ideal spacing for farm boundary plantation (69.16%) and Irrigation schedule (68.75%). Technological gap was found varied from component to component.

Paper received on 21/07/2025
Paper Accepted on 26/10/2025

REFERENCES

Atanda, J. 2015. Environmental impacts of bamboo as a substitute constructional material in Nigeria, Case Studies in Construction Materials. 3: 33-39.

Bagdi, G.L., Kurothe R.S., Rao B. K.,Pande V.C. and Kumar G. 2013. Farmer's perception towards adoption of bamboo in Mahi ravines, Indian Journal of Soil Conservation, 41(1): 88-87.

Dilipkumar, D. and Venkatram R. 2018. Production constraints in cultivation of pulp wood trees in Tamil Nadu. International Journal of Current Microbiology and Applied Sciences, 7(06).

Handique, P. (2011) . Studies on knowledge and adoption of cultivation practices of bamboos and its role in socio-economic development for tribal people in papumpare district of Arunachal Pradesh. Ph. D. (Ecology and Environmental Science)Thesis (Unpub.) E. P. Odum School of Environmental Sciences, Assam.

Lobovikov, M., Paudel S., Piazza M., Ren H. and Wu J. 2007. World bamboo resources. Editions INBAR and FAO., 18(1): 7-8.

Patel, A. G. and Vyas H. U. 2014. Technological gap in adoption of sugarcane cultivation practices by sugarcane growers. Gujarat Journal of Extension Education, 25(2): 227-229.

Rao, I. V. Ramanuja and Sastry B. C. 1996. Bamboo People The Environment.

Tomson Press, India Ltd. New Delhi. 4.

Troya, Mera, F. A. and Xu C. 2014. Plantation management and resource economics of bamboo in China. Cienciay Technology, 7(1): 1390-4051.

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