

# A Study on Consumer Purchasing Behavior towards Bamboo Based Products

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**Abstract:** *Bamboo is considered as a low cost raw material which is easily available and used for making multiple products. Bamboo is a renewable source: fastest growing plant as mentioned in the Guinness Book of records which keeps on regenerating by itself for more than 75 years even after harvesting. The objective of the research paper is to study consumer purchasing behavior for different Bamboo based products and to examine the problems faced by the consumer while purchasing Bamboo products. It follows a descriptive research design and based on primary data collection from 108 respondents of Gujarat state using convenience sampling method. Bamboo products will be a good substitute for plastic and wooden products. It helps in carbon sequestration and in mitigating the global warming effects. Increase in the purchase of Bamboo Based products will create employment opportunities for the poor section of the society thus it leads to the poverty reduction of our country.*

**Keywords:** Bamboo, consumer purchasing behavior, eco friendly, renewable source, sustainability

## 1. Introduction

In the present era where we are facing problems like overexploitation of our natural resources, harsh consequences of global warming leading to abrupt flood situation and rising CO<sub>2</sub> levels causing increased greenhouse effect, depletion of our limited reservoirs of non-renewable energy sources and many more. This is the time for the world to explore renewable resources and regenerative forms of energies to replenish the damage caused to our Mother Earth. Across the globe people have started adopting green economic factors in their daily life to build a healthy environment for future generations. Lots of studies have been performed on the importance of eco-friendly, biodegradable products. This research paper has been designed to understand the consumer purchase behavior for bamboo based products. Why Bamboo –an eco friendly raw material has been chosen for this research? The reason behind selection of bamboo and its products for the research is to solve the above mentioned environmental issues by going Green. Moreover, Bamboo is the fastest-growing, self-regenerating, renewable raw material and most versatile plant on Earth. These unique features like versatility, renewability, regenerative feature and easy adaptability makes the Bamboo plant the best low cost manufacturing raw material of the 21<sup>st</sup> century.

## 2. Literature Review

(Sreelekha & Ambily, 2018) [5] have studied consumer perception towards the online marketing for bamboo based products in Aluvataluk of Ernakulam district. In the era of internet technology, the authors have recommended the online marketing of bamboo based products apart from traditional marketing for the growth of bamboo based businesses to be more profitable and sustainable. The adoption of online marketing will surely increase the

demand for bamboo products in national and international markets.

(Kumari & John, 2016) [3] have tried to find out the factors that influence green marketing on perceived knowledge of eco-friendly products. The study suggested that consumers have started to purchase environmentally friendly products to protect the environment and to improve the quality of life for current and future generations. Though the price level of organic products is higher than that of inorganic products, the hygienic condition, healthiness and the taste of organic products gives the maximum level of satisfaction to the consumers. Overall study has suggested the improvement in the customer satisfaction level on organic products during the present scenario.

(Majumdar, Ji, & Banerjee, 2017) [4] has investigated the gap in the customer preferences and current bamboo based industry value analysis proposition. Lack of awareness, limited training focused only on techniques, lack of design awareness and sensitivity, lack of branding and marketing knowledge and limited outreach of self help groups (SHG) and clusters are the main research gaps observed by the author. The results showed that consumer found the Bamboo products to be “Beautiful/Aesthetic”, “Eco-Friendly”, “Light-weight”, “Homely” and “Strong” while some of the unfavourable feedback include being “Obsolete”, “Not durable”, “Not strong” and “Prone to Termite Infestation”. The author suggested to organise proper training and skill development programmes and ICT sessions by the government authorities for the rural craftsman to understand the changing market scenario and the use of online marketing for global accessibility of their products for higher profitable business.

(Kaur, Pant, & Kaushik, 2019) [2] presented the information regarding the basic features and properties highlighting the economical and ecological importance of bamboo species to formulate the strategies for specific

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utilization of these species making it the best multi - utility profitable raw material. Some of the unique characteristics of Bamboo are faster growth rate, high tensile and compressive strength, low weight to high height ratio It is considered to be the "Material of Future" which grows effortlessly with numerous species available across the world and a suitable alternative for wood, metal, steel and plastic etc. with wider applications.

(Francois & Liaw, 2019) [1] evaluated and grouped the applications as well as benefits of bamboo, then did comparison of the views of consumers and businessmen to find the expectation gap between them and estimated the correlation between the importance of bamboo applications with the perceived benefit of bamboo. The data analysis was performed on a sample of 469 respondents divided into two parts 378 for consumers and 91 for businessmen conducted in Haiti. The results indicated that the consumers are focussed on the utility of end user application which can be beneficial for them and businessmen focussed on the profit generated. The results showed a positive relationship between the importance of bamboo with the perceived benefits.

### 3. Research Methodology

#### 3.1 Need/ Importance of the study

In order to solve various environmental issues, instead of following 3 R's: recycle, reuse and reduce for sustainable living we need to add new concepts of being renewable and regenerative nature so that we can recover rapidly for the exploitation of what has been done by humans to Mother Earth. This research paper highlights the importance of Bamboo in the industrial sector as low cost eco - friendly raw material for manufacturing various biodegradable products. The study is also focused on collecting views and suggestions of people belonging to different districts of Gujarat regarding their preference and purchasing decision for bamboo based products.

#### 3.2 Objectives of the study

- 1) To study consumer behavior for the purchase of different Bamboo based products.
- 2) To examine the problems faced by the consumers while purchasing Bamboo products.

#### 3.3 Sampling Design

Descriptive research design and non - probability based convenience sampling method has been used for data collection.

#### 3.4 Methods of Data Collection

For conducting this research, a structured questionnaire was designed to collect the responses and a sample of 108 respondents has been taken for data analysis. The instrument poses a set of questions designed to assess problems faced by the consumer behavior while purchasing bamboo based products. A five - point Likert - type scale is used in this

study varying from 1) Strongly DisAgree 2) DisAgree 3) Neutral 4) Agree 5) Strongly Agree

### 3.5 Research Tools

Microsoft Excel, Jamovi and MegaStat have been used to analyze and interpret the data. Descriptive studies, chi - square test and Friedman test have been performed to understand the consumer behavior towards bamboo products.

### 3.6 Limitation & Scope of the Study

The study is based on the consumer responses that belong to different districts of Gujarat. India is the second largest producer of bamboo in the world after China, so there is a lot of scope for development of the Bamboo based sector. There are numerous unique features of bamboo like fastest growing plant, versatile, durable; renewable as well as eco - friendly which makes it one of the best low cost raw materials for manufacturing multiple products. Therefore such characteristics of bamboo as a raw material creates several unexplored research areas in the field of development of bamboo related businesses. This research paper is to understand consumer behavior with respect to problems faced by them while making purchase decisions. This will encourage the establishment of bamboo based small, medium and large scale industries which will surely create employment opportunities for the poor uneducated section of the society and will create a better marketing domain for bamboo based products.

## 4. Data Analysis and Findings

#### Demographic profile of the respondent:

Number of Respondents (N) = 108,

Minimum value = 1, Maximum value = 5

**Table 1: Demographic Profile of Respondents**

Characteristics	Dimensions	Frequency	Percent
Age	15yr - 20yrs	7	6.48%
	21yrs - 30yrs	19	17.59%
	31yrs - 40yrs	41	<b>37.96%</b>
	Above 40 yrs	41	<b>37.96%</b>
Gender	Male	56	51.85%
	Female	52	48.15%
Marital Status	Single	18	16.67%
	Married	90	<b>83.33%</b>
No. of Earning Members	One	51	<b>47.22%</b>
	Two	46	42.59%
	Three	6	5.56%
	More than 3	5	4.63%
Educational Qualification	Upto 12th std	21	19.44%
	Graduation	44	<b>40.74%</b>
	Post Graduation	41	37.96%
	others	2	1.85%
Family Monthly Income	Below 35000	35	32.41%
	Rs 35001 - Rs 55000	16	14.81%
	Rs 55001 - Rs 75000	14	12.96%
	More than Rs 75000	42	38.89%
Frequency of purchase of bamboo based products	Weekly	3	2.78%
	Monthly	11	10.19%
	Yearly	23	21.3%
	Rarely	71	<b>65.74%</b>

As shown in the Table 1, Out of 108 respondents 75.92% of the respondents are above the age of 31yrs and 83.33% are married. Around 65.74% of the respondents rarely purchase bamboo based products while 21.3% respondents purchase in a year. Hence it clearly shows the low demand for such products by the consumer and moreover it is the actual cause of low profit margins earned by the bamboo based producers.

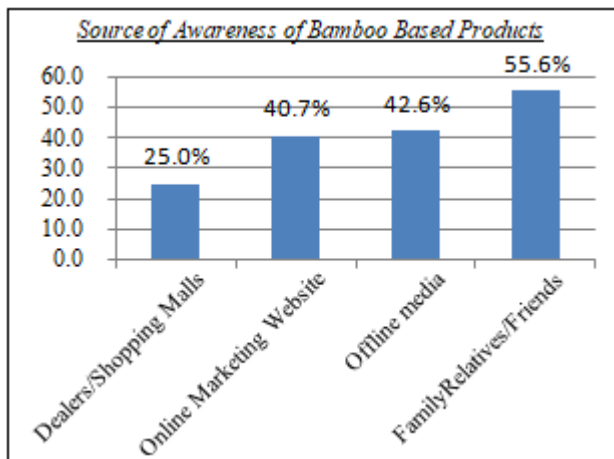


Figure 1

Above Figure 1 presents a graphical distribution of sources of awareness of bamboo based products. Findings conclude that still consumers get to know about the availability of bamboo products from friends, relatives and families. Online and Offline marketing media has a relatively low contribution of approximately 40% in creating awareness which needs to be developed in our country.

Table 3

		Rarely	Weekly	Monthly	Yearly	Total
Monthly	Below 35000	15 42.9%	3 8.6%	6 17.1%	11 31.4%	35 100%
	Rs 35001 - Rs 55000	11 68.8%	0.0%	1 6.3%	4 25.0%	16 100%
	Rs 55001 - Rs 75000	14 93.3%	0.0%	1 6.7%	0.0%	15 100%
Family	More than Rs 75000	31 73.8%	0.0%	3 7.1%	8 19.0%	42 100%
	Total	71 65.7%	3 2.8%	11 10.2%	23 21.3%	108 100%
		18.78 chi - square				
		9		df		
		.0272		p - value		

Table 4

Gender	Rarely	Weekly	Monthly	Yearly	Total
Male	30 53.6%	2 3.6%	6 10.7%	18 32.1%	56 100.0%
Female	41 78.8%	1 1.9%	5 9.6%	5 9.6%	52 100.0%
Total	71 65.7%	3 2.8%	11 10.2%	23 21.3%	108 100.0%
			9.34	chi - square	
			3	df	
			.0251	p - value	

Table 3 presents the cross tabulation analysis of family monthly income and frequency of purchase of bamboo based products, while Table 4 shows the cross tabulation results of gender with respect to frequency of purchase of bamboo products. The p - values for Table 3 and Table 4 are 0.0272 and 0.0251 respectively i. e. less than the 0.05 which leads to the conclusion that there is a significant difference between family monthly income and gender with respect to their frequency of purchase of bamboo products.

Table 5: Frequency distribution of consumer purchasing behavior towards bamboo based products:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
V.1 Lack of knowledge regarding Bamboo Based products.	26.85%	24.07%	25.93%	14.81%	8.33%
V.2 Unaware of Bamboo based product sellers and manufacturers	29.63%	26.85%	19.44%	12.04%	12.04%
V.3 Bamboo based products are not commercially available	20.37%	27.78%	27.78%	12.04%	12.04%
V.4 Unaware of characteristics and importance of bamboo as a raw material	33.33%	16.67%	20.37%	17.59%	12.04%
V.5 Lack of Online media involvement	46.30%	21.30%	18.52%	4.63%	9.26%
V.6 Lack of Offline information available	37.96%	20.37%	26.85%	8.33%	6.48%
V.7 Bamboo products are very expensive	10.19%	19.44%	35.19%	21.30%	13.89%
V.8 Marketing of Bamboo based products is underdeveloped in our country	49.07%	20.37%	17.59%	6.48%	6.48%
V.9 Durability of bamboo products is doubtful that is why do not purchase these products	18.52%	18.52%	25.93%	9.26%	27.78%
V.10 Prefer to purchase low cost substitute products made of plastic, steel etc	21.30%	24.07%	20.37%	12.04%	22.22%

From the above Table 5, it is clearly inferred that 69.44% (V.8) of the respondents strongly agree for underdeveloped marketing of the bamboo based products in our country. Moreover 67.6% (V.5) and 58.33% (V.6) of the respondents agree that lack of online and offline media involvement respectively is responsible for the low demand for such products. About 35.19% respondents are neutral and 35.19% respondents disagree with the fact that bamboo based products are expensive (V.7) for them to purchase. Most of the high quality durable bamboo based products are available at reasonable and affordable prices.50.92% (V.1)

of the respondents expressed their lack of knowledge regarding bamboo products while 56.48% (V.2) confirmed their unawareness regarding bamboo based sellers and manufacturers. About 48.15 % (V.3) of the consumers agree for commercial unavailability of bamboo based products. Mode values calculated for the variables V.1, V.2, V.4, V.5, V.6 and V.8 is 5 in Likert scale which means most of the consumers have similar views as strongly agree towards these variables. While variables V.3 and V.10 have mode values equal to 4 which means they agree with the given variables.

Mode values are 1 and 3 for variables V.7 and V.9 respectively means respondents either have neutral behavior or disagree with these variables.

**Table 6: Friedman Test Results**

Friedman Test		
Sum of Ranks	Avg. Rank	
598.50	5.54	Lack of knowledge regarding Bamboo Based products.
620.50	5.75	Unaware of Bamboo based product sellers and manufacturers
569.00	5.27	Bamboo based products are not commercially available
596.00	5.52	Unaware of characteristics and importance of bamboo as a raw material
698.00	6.46	Lack of Online media involvement for Bamboo based products
691.50	6.40	Lack of Offline information available related to Bamboo based products
453.50	4.20	Bamboo products are very expensive
724.50	6.71	Marketing of Bamboo based products is underdeveloped in our country
472.00	4.37	Durability of bamboo products is doubtful that is why do not purchase these products
516.50	4.78	Prefer to purchase low cost substitute products made of plastic, steel like kitchenware, furniture etc
5,940.00	5.50	Total
	108	n
	113.084	chi - square (corrected for ties)
	9	d. f.
	3.46E - 20	p - value

As shown in the Table 6 for Friedman analysis, there is a significant difference (reject Ho) between the mean ranks of the 10 variables when taken together. But when the Friedman analysis test is performed by taking two variables together, for some of the variable pairs the observed p - values is greater than 0.05 which confirms that there is no significance difference (accept Ho) between them. The Spearman's correlation test has been performed to find out the correlation between these ten variables.

**Table 7: Spearman's rank correlation coefficient matrix**

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10
C1	1.000									
C2	.674	1.000								
C3	.590	.595	1.000							
C4	.726	.637	.540	1.000						
C5	.385	.463	.416	.457	1.000					
C6	.587	.690	.578	.587	.694	1.000				
C7	.385	.387	.448	.399	.189	.272	1.000			
C8	.398	.467	.431	.427	.601	.516	.318	1.000		
C9	.533	.518	.488	.396	.231	.414	.481	.327	1.000	
C10	.503	.488	.401	.464	.230	.250	.402	.247	.561	1.000

In the above Table 7, results of the spearman's rank correlation test performed for the 10 variables taking all of them for the 108 respondents, the coefficients which are highlighted predict positive correlation between the factors for which there is no significance difference between them i.e. accept Ho.

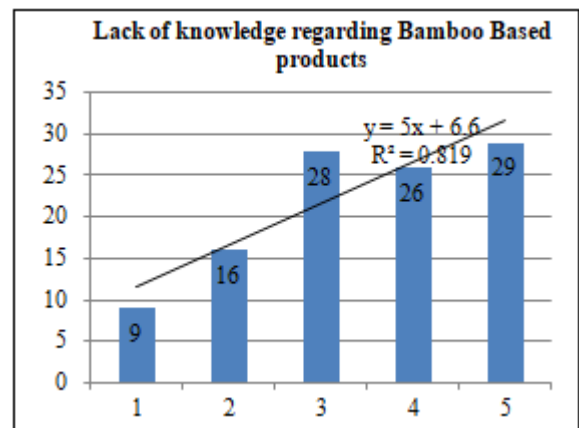
As shown in the above spearman's correlation matrix, we can infer that variable V1 has strong positive correlation

with V2 (0.674) and V4 (0.726) which means lack of knowledge regarding the characteristics of bamboo as a raw material and unaware of bamboo based product sellers will create low demand for Bamboo based products. There is a positive correlation between the variable V5 and V6 (0.694) which means lack of online media and offline information related to the bamboo based products leads to low sales and less profit generation from bamboo products.

**Graphical Analysis of Problems Faced by consumer while purchasing Bamboo Based Products**

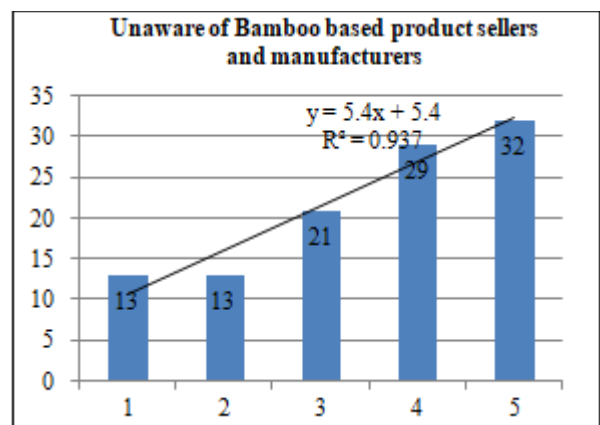
- 1. Strongly Disagree
- 2. Disagree
- 3. Neutral
- 4. Agree
- 5. Strongly Agree

**1) Lack of knowledge regarding Bamboo Based products**



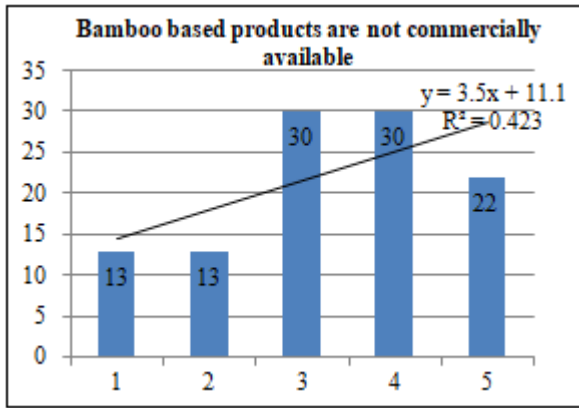
Since R square is equal to 0.819 which means that 81.9% of the consumers strongly agree that lack of knowledge regarding bamboo based products is the main reason for low demand for these products

**2) Unaware of Bamboo based product sellers and manufacturers**



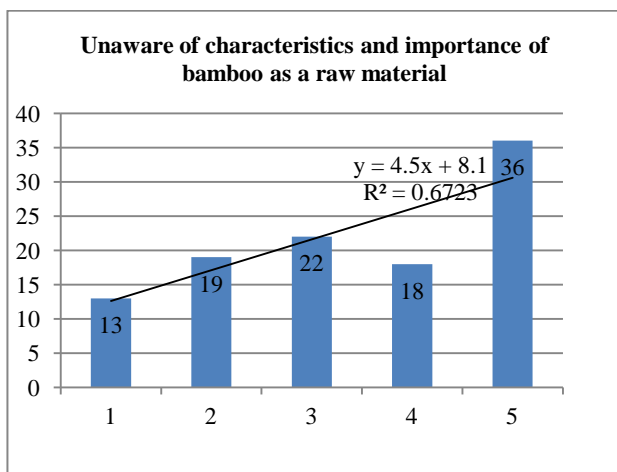
Since R square is equal to 0.936 which is a good fit means that 93.6% of the consumers strongly agree that unawareness regarding bamboo based sellers and manufacturers is the main reason for less purchase by them for these products.

**3) Bamboo based products are not commercially available**



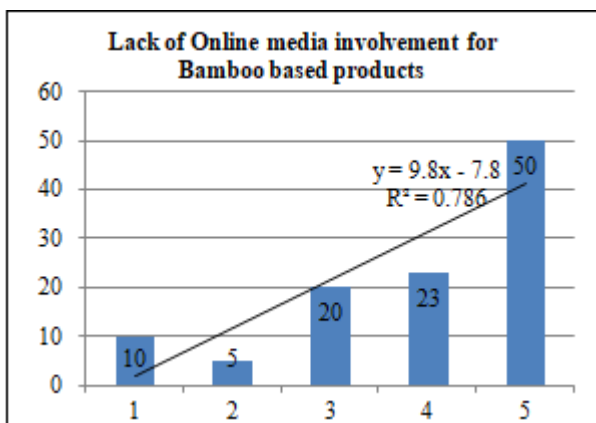
More than half of the percent of respondents agree with the commercial unavailability of the bamboo based products.

**4) Unaware of characteristics and importance of bamboo as a raw material**



Increasing trend line shows that most of the respondents believe that they are not aware of the characteristics and importance of bamboo as a raw material. Hence such consumers rarely purchase these products.

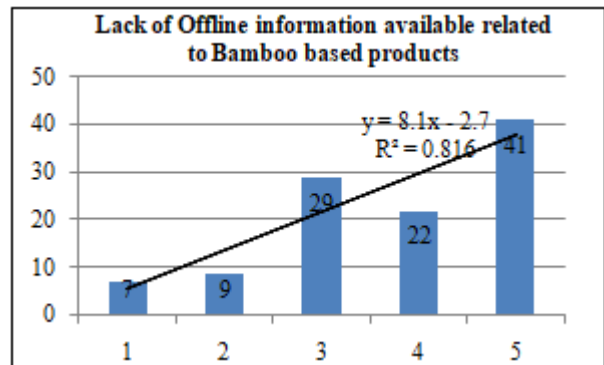
**5) Lack of Online media involvement for Bamboo based products**



Since R square is equal to 0.786 which means that 78.6% of the consumers strongly agree that lack of online media

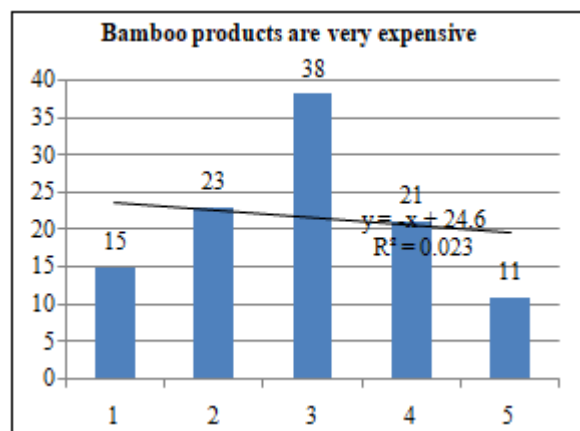
involvement towards bamboo based products is the reason behind low sales figures for bamboo based products.

**6) Lack of offline information available related to Bamboo based products**



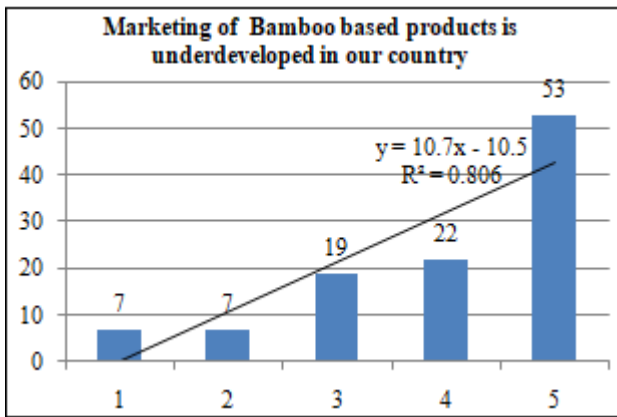
Since 63 out of 108 respondents agree that lack of offline information related to bamboo based products is the reason behind less consumer awareness regarding these products. Most of the bamboo based microenterprises are tribal people who dwell in remote forest areas with low customer base for their products. In such a scenario, newspapers, magazines, television media etc will be helpful in building the interaction between the consumer and the sellers of such bamboo based products.

**7) Bamboo products are expensive**



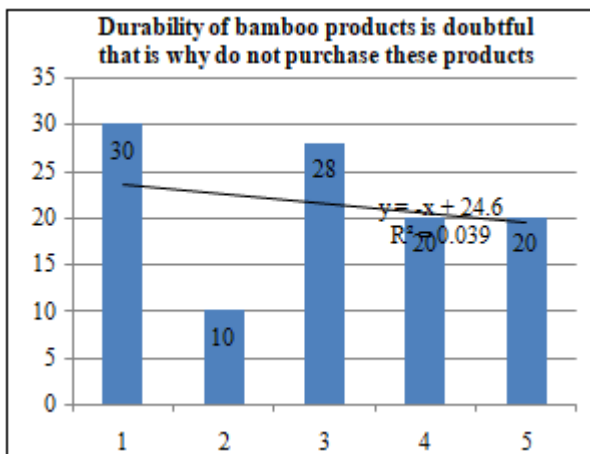
Decreasing trend line shows that most of the respondents believe that bamboo based products are not very expensive. However due to certain variables like V.1 (lack of knowledge regarding bamboo products), V.2 (unaware of bamboo based sellers), V.3 (not commercially available), V.4 (unaware of importance of bamboo as a raw material), V.5 (lack of online media involvement) and V.6 (lack of offline information available) as discussed above consumers rarely purchase these products.

**8) Marketing of Bamboo based products is underdeveloped in our country**



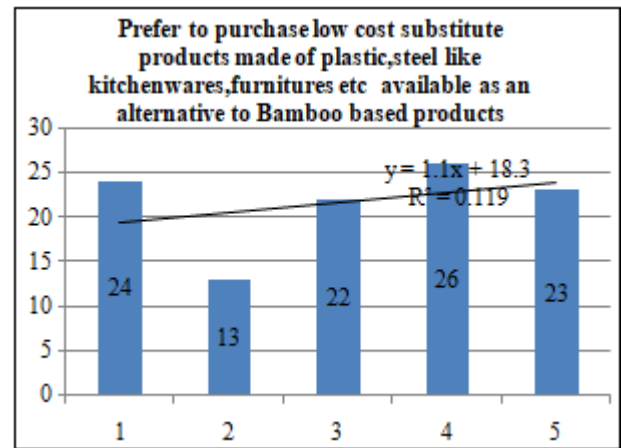
Since R square is equal to 0.806 which means that 80.6% of the respondents strongly agree to the fact that marketing of bamboo based products is underdeveloped in our country. In order to cop up with the issues of global warming, deforestation and increasing pollution, bamboo has proved to the best low cost raw material of 21<sup>st</sup> century for making eco - friendly products. It is the responsibility of the higher authorities to come up with innovative marketing strategies for the promotion of eco - friendly products made up of bamboo.

9) Durability of Bamboo products s doubtful that is why do not purchase these products



Decreasing trend line shows that most of the respondents disagree that durability of bamboo based products is doubtful. This means that they have an experience of purchasing such products and through their higher satisfaction level they feel that such bamboo based products are durable and long lasting.

10) Prefer to purchase low cost substitute products made of plastics, steel etc available as an alternative to bamboo based products



Availability of low cost substitute products made of plastic, steel etc has affected the marketing of bamboo based products. High inflation has reduced the purchasing power of individuals because of which in - spite of knowing the worst consequences of non biodegradable products, they prefer to purchase such low cost substitutes. Reducing the price of eco - friendly products, better promotion and marketing efforts, encouraging bamboo plantation etc are some of the solution for the development of bamboo based industries.

5. Recommendations and Suggestions

This research has collected the valuable suggestions of the consumers regarding their purchase behavior towards the bamboo based products and the way they perceived the use of such products for achieving environmental sustainability. Bamboo is one of the fastest growing plants (mentioned in the Guinness book of record) with several unique features like renewability, versatility, high tensile strength, durability, flexibility, elasticity which confirms it as the best raw material for making various long lasting eco - friendly products. Lack of knowledge about recent developments in the bamboo based sector, low online and offline media involvement are the main reasons for the underdeveloped marketing of bamboo based sector. Bamboo plants mature within the time duration of 5 yrs and have regenerative properties while hardwood trees take more than 15yrs to get fully grown, hence bamboo is considered to be a good substitute of hardwood timber. Therefore Bamboo forestry should be encouraged by the concerned authorities to compensate for the worse effects of deforestation, greening of wasteland, global warming and pollution. There should be well planned strategies formulated by the concerned authorities for understanding the value chain analysis from producer to the manufacturer level for promoting commercial availability of these products till it reaches to the consumer.

6. Conclusion

The questionnaire was designed to collect views of respondents regarding purchase decisions for bamboo based products. Most of the consumers feel that bamboo goods are eco - friendly, durable, light weight, have aesthetic appeal, biodegradable and non - toxic in nature. Bamboo is moreover an easily available natural raw material for

manufacturing multiple utility products. Most of the customers have suggested that bamboo based products will be a low cost solution and a good substitute for wooden and plastic products. By expanding the customer base, the bamboo based sector will create employment opportunities for the lower section of the society specially the tribal people who have inherited this beautiful legacy from their ancestors but because of low demand for their product and less support of higher authority, this art is in the declining stage. In the era of global warming, deforestation, all sorts of pollution - land, water and air, rejuvenation of bamboo forestry is the best solution and development of bamboo based sector will lead to socio - economic growth of poor people. Some of the people are not aware of bamboo products as they have never purchased such products but they are sure that promotion of bamboo products will be a great idea towards attaining environmental sustainability and will save our Mother Earth from non biodegradable waste such as plastic, wax products etc. Most of the consumers have shown their concern for poor marketing of bamboo products in our country and lack of online –offline media for the promotion of eco - friendly bamboo products. Some of the end - user feels that continuous use of Bamboo based products will create a healthy and safe pollution free environment for our future generation.

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