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Transforming Okra (*Abelmoschus esculentus L.*) Waste in to Wealth: Empowering Farmers Through Sustainable Handicrafts

Kiran Pant* and A K Sharma**
Krishi Vigyan Kendra
Govind Ballabh pant University of Agriculture and Technology , Dehradun (Uttarakhand)

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ABSTRACT

Okra (*Abelmoschus esculentus L.*), belonging to the family Malvaceae, is commonly known as Lady's finger, as well as by several vernacular names, bhindi, okura, quimgombo, bamia, gombo, and lai long ma, in the different geographical regions of its cultivation. Keeping in mind the importance of Handicraft and large production of Okra in the plains of Uttarkhand ,the indigenous technologies of making handicraft products was blend with okra fiber and beautiful products were made. One hundred and fifty women from different villages namely Charba, Atenbag, Sherpur, Bhood and Dhalipur from two blocks of Dehradun district who were already exposed to indigenous technology of handicraft products making of other fibers like Rambaans, Bheemal and Nettle, were given training about the extraction and making of handicraft products of okra fiber. The okra plants were bundled comprising of 70-100 plants. Each of these bundles was immersed in a concrete tank containing soft water and the stalks of the plant were tapped slightly with wooden hammer for removal of soft pulp, the fibers were separated thoroughly from the pulp, washed, combed and exposed to sunlight for two days until the odor was removed from fibers and used for handicraft making. Different parameters for acceptance and further adoption were studied so that further strategies could be planned to popularize among the farming communities. and it was observed that majority of the respondents learned this craft from elder family member (52.00%). Interest in craft and also to utilize free time were the two common reason for learning the craft of handicraft product making. Quality and fineness of okra fiber as fully accepted by majority of the respondents. The obstacle faced while adopting handicraft as occupation were also studied so that future strategies could be made after rectifying the problems.

Key Words: Fiber, Handicraft, Okra, Processing, Sustainable.

INTRODUCTION

Okra (*Abelmoschus esculentus L.*) of the family Malvaceae, known as Lady's finger, goes by numerous vernacular names such as okra, bhindi, okura, quimgombo, bamia, gombo, and lai long ma, depending on the geographical region where it is cultivated. The benefits of cultivating okra can be beneficial in dual way, as after harvesting the pods the whole plant may be utilized for fiber processing. After going through retting, washing, carding, fiber making the ultimately weaving to a fabric, this can be utilized in textile industry.

Handicraft making in Uttarakhand harnesses the rich bounty of natural fibers endemic to its terrain, such as Sisal, Agave, Bhimal, Jute, hemp, wool, and nettle. These fibers are sustainably harvested from the region's diverse flora, supporting local communities and preserving traditional craftsmanship. Uttarakhand's artisans skillfully weave these fibers into a myriad of products, including intricately

Corresponding Author's Email - kiranpant17@gmail.com
*Dr. Kiran pant, Programme Assistant, GBPUA&T, KVK Dehradun
** Dr. A.K.Sharma, Professor, GBPUA&T, KVK,Dehradun

patterned shawls, durable rugs, and sturdy baskets. Each piece not only reflects the natural beauty of the Himalayan foothills but also embodies a commitment to eco-friendly practices and cultural heritage. By promoting the use of natural fibers, Uttarakhand's handicraft industry not only sustains livelihoods but also contributes to global efforts in sustainable development and environmental stewardship. Keeping in mind the importance of Handicraft and large production of Okra in the plains of Uttarkhand ,the indigenous technologies of making handicraft products was blend with okra fiber and beautiful products were made.



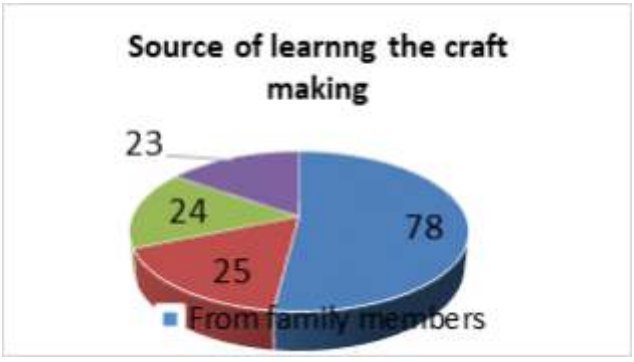
MATERIALS AND METHODS

This unique work of making handicraft products from okra fiber was done in Dehradun district. As this was a new initiative taken by Krishi Vigyan Kendra Dehradun ,a limited number of rural community was aware about this. Hence, seven trainings were conducted during the year 2021-2023 to create awareness among the rural community regarding this new concept.One hundred and fifty women from Charba, Bhood, Sherpur Atenbag and Dhalipur of Vikasnagar and Sahaspur blocks of Dehradun district who were already exposed to indigenous technology of handicraft products making of other fibers like Rambaans, Bheemal and Nettle, were given training about the extraction and making of handicraft products of okra fiber. Twenty one days exhaustive training programme at Charba was also conducted on designing and making fiber products along with an NGO. Purposive sampling technique was followed to select the villages as well as the respondents and only those respondents who were practicing this craft were selected for the study. The data was gathered with the help of an interview schedule and by observation methods. The data were collected through personal interview method using structural schedule. The entire data were transformed into normal score and the findings were assessed to identify the performance of okra fiber craft among the rural women by using the percentage .



RESULTS AND DISCUSSION

Globalization and internet marketing has opened excellent avenues for the resurgence of traditional crafts of India. The need is to provide enough incentives to the artisans so that they are motivated enough to adopt the skills they have inherited and adopt it as occupation which provides them substantial financial benefits Bains *et al,* 2019.



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Table 1. Source of learning the Craft making. (n=150)

Sr. No.	Source of learning	No. of respondents	Percentage of respondents
1	From family members	78	52.00
2	From friends	25	16.67
3	Other organizations	24	20.00
4	Self Help Group	23	19.67

Table2:Reasons behind adopting the handicraft as occupation . (n=150)

Sr. No.	Reasons behind adopting the handicraft as occupation	No. of respondents	Percentage of respondents
1	Family profession	29	19.33
2	Interest in craft	47	31.33
3	To utilize free time	46	30.67
4	Generate subsidiary income	28	18.67

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From family membersCreating handicraft products is primarily a family-based activity, typically pursued during leisure hours and in communal spaces. However, in recent times, the globalization of markets has proven advantageous for rural artisans, enabling them to secure competitive prices for their products and commercialize their traditional knowledge effectively. The respondents were asked about the source (Table 1) from where they received the knowledge regarding making of different types of handicraft of fiber and it was observed that majority of the respondents learned this craft from elder family member(52.00%). Moreover, the majority of families still practicing this craft were those who had previously received monetary benefits from it.

The artisans were asked aboutreasons behind adopting the handicraft as occupation (Table2).

The data reveals that almost equal number found it as because they have "Interest in craft "and also "To utilize free time"(31.33 and 30.67 percentage simultaneously),while family profession and "To Generate subsidiary income" were two reasons which were observed by19.33 and 18.67 percentage of respondents as reasons behind adopting the handicraft as occupation. As the study was conducted on those artisans who were already engaged in fiber handicraft, Krishi Vigyan Kendra introduced a new technology of Okra fiber, acceptance towards adoption of new ideas/Innovations was also a criteria which was studied. After introducing the okra fiber the products were made on the similar pattern as by other fiber which the respondents were using since a long time.

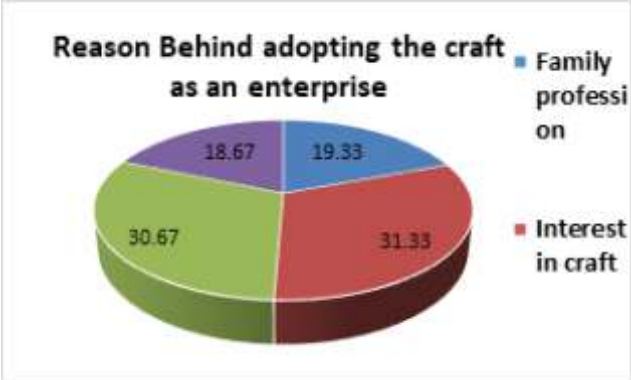


Table 3: Acceptance towards adoption of new ideas/Innovations

Sr. No.	Acceptance towards new idea/	Percentage of respondents		
		Fully	Partially	Not
1	Modification in designs	78 (52.00)	53 (35.33)	19 (12.67)
2	Use of Different Fiber (Okra)	73 (48.67)	41 (27.33)	36 (24.00)
3	Quality and fineness of okra fiber	99 (66.00)	48 (32.00)	3 (2.00)
4	New packaging and presentation ideas	78 (52.00)	67 (44.67)	5 (3.33)

Level of Acceptance towards adoption of new ideas/Innovations was studied to find out the acceptability of new technology and different criteria were kept on mind (Table 3). Highest percentage of artisans (66.00 %)reported "Quality and fineness of okra fiber" as fully accepted and while "Modification in designs" and"New packaging and presentation ideas were observed"by equal percentage of respondents as fully acceptable (52.00 %).Use of different fiber(Okra)was accepted by 48.67 percent of artisans . As this was the first time when the farming community was introduced to okra fiber for making of handicraft products. The fear of acceptance and marketing may be reason behind lessacceptance.



The obstacle faced while adopting handicraft as occupation were also studied (Table 4) so that future strategies could be made after rectifying the problems. "Lesser Know how of modern market trends" "Low wages" " Lack of availability of raw material "were the top three ranked as 1'st, 2'nd and at 3'rd priorities by 88.00,82.00 and 78.00 percent of respondents. "Lesser recognition on traditional values", "Exploitation by the Middlemen", "Lack of cooperation among the artisans". "Decreasing demand due to change inThe taste & interest of people" and "Lesser Know how of Marketing system" were the obstacles prioritized level (4'th to 8'th priority levels simultaneously) perceived by the respondents

Plant and Its Fiber

Okra plant is one of the plentiful sources of natural fibers. Generally, the huge amount of okra plant stem is discarded on the field after collecting vegetable, without proper utilization and a large volume of okra plant stem is thrown away in the field each year The only use of these waste material is that as fuel. However, this biomass from the okra plant is a renewable, biodegradable, cost efficient and low-density source for production of fibers. The fibers can be extracted from the plant's stems or other parts and processed to create a usable textile material. These okra fibers can be used to make fabrics, twine, or other handicraft materials. However, it's important to note that the use of okra fibers in textiles is not as common or widely established as other natural fibers like cotton, hemp, or flax. The okra fiber is bright, shiny, and strong, similar to the bark fibers

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Table 4. Obstacles faced by the artisans.

Sr. No.	Obstacles Encountered by the artisans.	Prioritization of problem		
		Frequency	percentage	Priority
1	Lesser Know how of modern market trends	88	58.67	1
2	Low wages	82	54.67	2
3	Lack of availability of raw material	78	52.00	3
4	Lesser recognition on traditional values	72	48.00	4
5	Exploitation by the Middlemen	69	46.00	5
6	Lack of cooperation among the artisans.	67	44.67	6
7	Decreasing demand due to change in The taste & interest of people.	65	43.33	7
8	Lesser Know how of Marketing system	55	36.67	8

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of jute, flax, and hemp fibers, and it can be spun into a yarn (Md. Rafiqul Islam). The exploration of okra fibers for textiles may be driven by factors such as sustainability and the search for alternative, renewable fiber sources. These are relatively easy to grow, and using their fibers for textiles could be a way to reduce the environmental impact associated with traditional textile production. The characteristics of okra plant fibers can vary based on factors such as the age of the plant, the part of the plant used (stems or other parts), and the processing methods employed. Additionally, the use of okra fibers in commercial applications is not as widespread or well-established as some other natural fibers like cotton or flax.

Traditional Steps in Processing of okra fiber: The okra is used for handicraft and textile purposes is found at the outer side of the plant core. The fiber from the bark of okra plant is bright, shiny and strong and very much similar to the other conventional bark fibers of jute, Bheemal, flax and hemp fibers. The fiber can be separated from pectin and plant core by various retting or degumming processes. In a retting process, the chemical bonds which hold the stem together are broken and separation of the bark fibers from the woody core takes place due to microbial activity or chemical effect. The traditional method which is used very commonly in hilly areas of Uttarakhand is retting, which removes the waxy epidermal tissue, adhesive pectin and hemicelluloses that bind the fiber bundles to each other. The okra plants were bundled comprising of 30- 40 plants. Each of these bundles was immersed in a concrete tank containing soft water for fifteen days. Later the stalks of the plant were tapped slightly with wooden hammer for removal of soft pulp. This was once again immersed and left in the tank for five days. Then the fibers were separated thoroughly from the pulp, washed, combed and exposed to sunlight for two days until the odor was removed from fibers. Afterword the dried fiber was kept safely in a dried place.







Handicraft Products of Fiber

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Procurement of Raw Material/ Harvesting: The okra plants were harvested when the stems were mature enough to contain strong fibers. The Okra plants were procured from field in green condition, and the stems were separated from plant. Then these were bbundled (30-35 plants in a bundle) for retting process.

Retting: Retting is a key step in fiber processing, where the stalks were soaked in water to loosen the fibers. The method used for retting was stagnant water retting which removed the epidermal tissue, adhesive pectin and hemicelluloses that bind the fiber bundles to each other. The okra plants were bundled comprising of 40-50 plants, and were immersed in a concrete tank containing soft water for 10-14 days. Later the stalks of the plant were tapped slightly with wooden hammer for removal of soft pulp.

Decortication: After retting, the fibers were manually separated from the stalks through decortication, where the woody core was removed, leaving the outer fibrous material.

Washing: The separated fibers were washed to remove any remaining impurities such as pectin, dirt, or microbes. Clean water was used with mild chemicals to enhance the cleaning process.

Drying: The fiber was dried in bright sunlight for about 48 hours.

Chemical treatment: The fiber was treated to remove excess lignin. This was done using a bath system with NaOH, Na2CO3, H2O2, sequestering agent, and wetting agent.

Carding and Spinning: After drying, the fibers were combed (carded) to straighten them and align the individual strands. Afterward, the fibers were spun into yarn.

The indigenous method of making okra fiber was to make handicraft items such as baskets, flower vase, coasters, footwear and other house hold items with the raw fiber so many times carding was not required.

CONCLUSION

Natural fibers are of vital importance due to their sustainability, biodegradability, and versatility. Unlike synthetic fibers, which often contribute to environmental pollution and resource depletion, natural fibers like cotton, wool, silk, jute and okra are renewable resources that have a significantly lower environmental impact. They support local economies by providing livelihoods to farmers and artisans while preserving traditional craftsmanship and cultural heritage. Additionally, natural fibers offer superior comfort, breathability, and aesthetic appeal in various applications, ranging from textiles and clothing to home furnishings and handicrafts. Their role in promoting sustainable practices and reducing the ecological footprint of consumer goods underscores their critical importance in today's global push towards environmental conservation and responsible consumption. By integrating indigenous knowledge with modern market opportunities, this initiative can drive economic empowerment while preserving traditional crafts and fostering environmental sustainability.

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