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HARITHA SARANGA AND SHAILAJA GROVER

SHAWLS OR STOLES? RESOURCE OPTIMIZATION PROBLEM AT LOOMS OF LADAKH

> If the villagers are to come into their own, the most natural thing that suggests itself is the revival of the Charkha and all it means.
>
> --- Mahatma Gandhi

Abhilasha Bahuguna was deep in thought, browsing through the sketches put together by Nishant Raj for the upcoming launch of Looms of Ladakh (LL) products on the Okhai platform. She was scheduled to meet Nishant Raj and Milee Parmar, two young executives recruited by the Looms of Ladakh Women's Cooperative (LLWC) a year ago to bridge technical and managerial gaps. The four-year-old LLWC manufactured products using pashmina, yak, and other local wool under the brand name LL. The team had been busy over the past couple of months collecting data, arranging various processes, and identifying the right type of resources for the approaching events. There was a plan to launch the brand LL with a collection of woven and knitted pashmina products in India during Diwali, followed by another assortment in the international market during Christmas, both through online platforms. The launches would test the strategies that Bahuguna had planned as the full-time director and founder of LLWC.

While the two full-time executives were working very hard along with LLWC's elected members, there was mounting pressure from the collaborators who were showcasing LL's products on their website. The launches were a completely different ballgame compared with the sales at their flagship store in Leh. The products had to be ready for shipping at least a week before the launch. A photoshoot with models was to be conducted on time to upload pictures, along with descriptions of products and artisans, on the website. While the raw material was ready for processing, Bahuguna was unsure if they had the time and resources to meet the merchandise demand for both events. While skimming through the designs for sweaters, stoles, gloves, caps, and shawls that Raj had put together, she wondered which of these products would be ideal for the respective launches. The dilemma was whether they should focus on optimizing the available raw material or on maximizing revenue with their limited resources.

LADAKH AND CHANGRA GOATS

India's highest plateau, Ladakh, extends from the Siachen glacier in the north to the Himalayas in the south. The region derives its name from *La-dwags,* meaning "the land of high passes." It is also one of the most sparsely populated regions of India. *Changthang*, originating from the Ladakhi word for "northern meadow," is part of the Tibetan Plateau, a very small portion of which extends into India. The difficult geographical conditions of the arid plateau are unfavorable for agriculture and provide poor connectivity to the outside world. Changthang is the birthplace of the fabled pashmina, one of the finest varieties of cashmere[1] in the world.

[1] Cashmere, is a fiber obtained from cashmere goats, pashmina goats, and some other breeds of goats

Haritha Saranga, Professor of Operations Management at IIM Bangalore, and Shailaja Grover, Guest Faculty at IIM Bangalore, prepared this case for classroom discussion. Looms of Ladakh Women Cooperative Ltd. cooperated and provided information to the Indian Institute of Management Bangalore in connection with the preparation of this case and it was reviewed and approved before publication by a company designate. No funding was sought or received from Looms of Ladakh Women Cooperative Ltd. for the development of this case. This case was also developed from available and permitted sources of information. This case is not intended to serve as an endorsement, source of primary data, or to show effective or inefficient handling of decision or business processes.

The residents of this area are mostly the *Changpas,* a nomadic and semi-nomadic pastoralist community consisting of traditional herders and grazers of goats, sheep, yak, and Bactrian camels. They rear the prized Changra goats[2]—often referred to as the "diamond fiber of inner coats"—that yield pashmina from their undercoat. Livestock farming drives the economy of the region, unlike in the lower belts of Ladakh , where trade, agriculture, and tourism flourish. In a typical Changpa family, the men engage in outdoor activities like rearing and shearing Changra goats and other animals, while the women knit and weave fabric to make clothes. Interestingly, everything the people wear, from their caps to shoes, is completely hand-woven, thereby making the communities self-sufficient. The skill of weaving is inherent to the community and has been passed down as a legacy.

At that time, the population of more than 2.5 lakh Changra goats in Jammu & Kashmir accounted for the entire pashmina yield from India, which was less than 1% of the annual global production. However, because of the high quality of the fiber, the Ladakhi Pashmina was highly valued across the world. The Indian government, through its Pashmina Wool Development Scheme (PWDS), made several efforts to improve the quality and quantity of the yield. These included the provision of financial aid for setting up pastures, goat exchange programs, investing in essential R&D, veterinary aid, consultancy, and training services to the Changra goat farmers.

PROJECT LAKTSAL

In 2015, Prasanna Ramaswamy, the deputy commissioner (DC) of Leh, and his wife, Abhilasha Bahuguna, set off on a mission to empower the local Changpa women. Their objective was to create sustainable means for these women artisans, so that they could produce world-class luxury apparel by leveraging their existing capabilities. Traditionally, these women had no source of income and were mainly involved in household chores or worked as laborers in road construction. The venture, Project Laktsal, meaning "skill" in Ladakhi, was a 6-month skill development program.

In its raw form, pashmina earned nearly ₹7000 per kg[3] for the farmer, whereas a pashmina shawl, made with 75 to 100 g of wool fetched retailers minimum of ₹10,000. Demand and supply dictated the price of raw pashmina in the international market, exposing it to frequent price fluctuations and challenging the fortunes of the herders. As a result, most youngsters from Changpa families preferred to move to the lowlands of Leh and Ladakh and work as laborers, rather than suffer from market uncertainties and low incomes. The Laktsal project had dual objectives: helping local women earn livelihood by adding value to locally available fiber and creating products that could be directly sold in the market, as well as preserving the traditional lifestyles of Changpa families (**Exhibit 1** describes the inception of this idea in a Facebook post in 2013).

Ramaswamy was the brain behind Project Laktsal. He toured in and around Changthang valley and gathered female artisans across eight villages who were interested in receiving training under the initiative. Each of the eight villages had a team of women who either reared Changra goats (and hence had access to the wool from the goats) or produced value-added products using yak or sheep wool. Through the program, the women were trained in various spinning and knitting activities with pashmina fiber for 3 months each. Around 62% of these women reared their own livestock and the rest of the producer group sourced raw materials from them. On processing the raw wool into yarn, the knitters in the group made them into apparel. With Bahuguna's support, Ramaswamy, other local authorities, and the women from the eight producer groups formed LLWC and began selling these clothes in a store established at Leh (the capital of Ladakh) under the banner of "Looms of Ladakh" in May 2017.

ABOUT LOOMS OF LADAKH

In 2017, the farm-to-fashion initiative, LL, was entirely run and managed by local women from eight villages[4] of Changthang. The aspiration was to democratize the luxury segment of pashmina for local artisans and achieve the

[2] The *Changra* goats or the *Capra Hircus* arenatives of the highland meadows of Ladakh.
[3] 1 USD = ₹80 approximately, as on August 31, 2022.
[4] The eight villages were Chuchot, Pheyang, Kharnakling, Stok, Chushul, Merak, Perma, and Sato.

royal patronage that pashmina deserved in the market. The objective of this fully autonomous cooperative venture, registered under *JK Self-Reliant Act, 1999*, was to ensure that the Ladakhi households gained maximum economic returns instead of selling their pashmina and other wool at throwaway prices to middlemen. By 2021, the brand managed to bring together nearly 200 households across the eight villages.

The dream of a homegrown, sustainable, luxury international brand, owned by herders and artisans, was born in the subsequent year. Since then, LL was driven to mobilize and upskill the community of women herders and artisans to build leaders and entrepreneurs, capable of competing in the international market. Furthermore, to ensure the long-term brand and environmental sustainability, LL focused on utilizing fibers from all animals of Ladakh–pashmina, sheep wool, and the rarer yak and Bactrian camel hair, striking a balance between ecology, culture, and economy.

The cooperative grew and the artisans upskilled themselves through various government and NGO partnerships brought in by Bahuguna. The elected herder-artisan leaders and Bahuguna worked together to hone their talents for multiple job-roles—CEO, cashiers, product officers, and event managers. They realized the need for scaling up and integrating professionals into the organization to capture benefits from the value chain for the local artisans. In 2020, as soon as they received some initial funding, LLWC recruited a couple of youngsters from the mainland to manage the design and operations, end to end. One of them, Nishant Raj, was a graduate of the prestigious National Institute of Design. The other, Milee Parmar, was from the Institute of Rural Management Anand (IRMA). While Raj took charge of designing garments based on the latest fashion trends, in both India and abroad, Parmar explored means to optimize the limited resources on hand to meet the demands through various marketing channels. After long deliberation, the managing committee, which included Bahuguna and some elected members of LLWC, decided to reach the market through the following three channels:

- B2B – by integrating some of the top fashion designers and their online platforms
- B2C – through the flagship store at Leh
- E-commerce – by launching a dedicated website for the brand

In the long run, LLWC aimed to achieve financial independence and become profitable while concentrating on the B2C segment. The key products in focus were woven (shawls, stoles, scarves, etc.) and knitted (sweaters, mufflers, caps, etc.), as can be seen from **Exhibit 2**.

PRODUCTION PROCESS

One of the first activities that Parmar undertook after joining LLWC was to understand and document the processes in converting pashmina into various apparel. This way, she could assist Raj in determining the categories of products that could be produced with the existing raw material and human resources. She surveyed several artisans from different villages to collect data on the type of activities, time, and the amount of raw material required (in grams per day) for each activity.

The process of weaving together this golden thread of elegance and beauty was initiated in spring by shearing the goats with long-toothed metal combs. Any delay in this activity could lead to hardening of the fur, making it tough to shed. Each goat could yield around 200–400 g of pashmina fur annually. After shedding, the wool was gathered, balled, and stacked. In the next stage, after washing and drying, finer fiber, thinner than one micron, was separated from coarser wool. The fibers were spun on the traditional charkha or *phang* to make yarns out of raw wool, followed by the plying process to make a single or twin yarn (two yarns were tied together). The plied yarn was then dyed in the desired colors, with some retained in their natural colour. At LLWC, 60% of the overall yarn was sent for dyeing and the remaining 40% moved to the next activity of weaving or knitting. At that time, as none of the artisans in LLWC were trained in the skill of dyeing, the process was outsourced to an external vendor. The completed yarn (single or double plied, dyed or natural color) was then moved to the weaving or knitting stage based on the intended end-product. Woven items included shawls, stoles, and scarves, while sweaters, mufflers, caps, and gloves were knitted. After knitting or weaving, the final products underwent a finishing process to make them ready for sale. The

production life cycle is summarized in **Exhibit 3**. Each product, based on its size and design, requires a specific quantity of raw material. The average raw material required for each product is given in **Exhibit 4**.

The artisans of LL could be categorized into spinners, weavers, and knitters based on their acquired skills in different types of activities. Parmar realized that the time taken for various processes differed for knitted versus woven products and depended on the quantity of material required for each product type. Parmar carefully noted the durations over several weeks and recorded the time taken by each artisan for each type of product on a daily basis, as given in **Exhibit 4**. This provides information on the production times for various activities in a typical set of products produced by the artisans at LL.

The cost of raw material (washed, dried, and sorted pashmina wool from Changra goats), according to the LL team's estimation, was approximately ₹10.25 per gram. They used the national minimum wage rate for arriving at the cost of shearing, washing, sorting, spinning, and knitting activities. The labor cost of weaving, on the other hand, was derived using the wage rate set by the handloom department. The labor cost per gram of raw material for each activity and the total dyeing cost are also provided in **Exhibit 4**. The total cost for each product constitutes the sum of raw materials, labor, and dyeing. To simplify, LL set the selling price of each product at twice the cost incurred in making the product. Bahuguna, Parmar, and Raj found that, after accounting for other costs such as marketing, advertising, and overheads, this approach resulted in a 20% profit margin on caps and gloves and 25% on the remaining products.

THE CHALLENGE

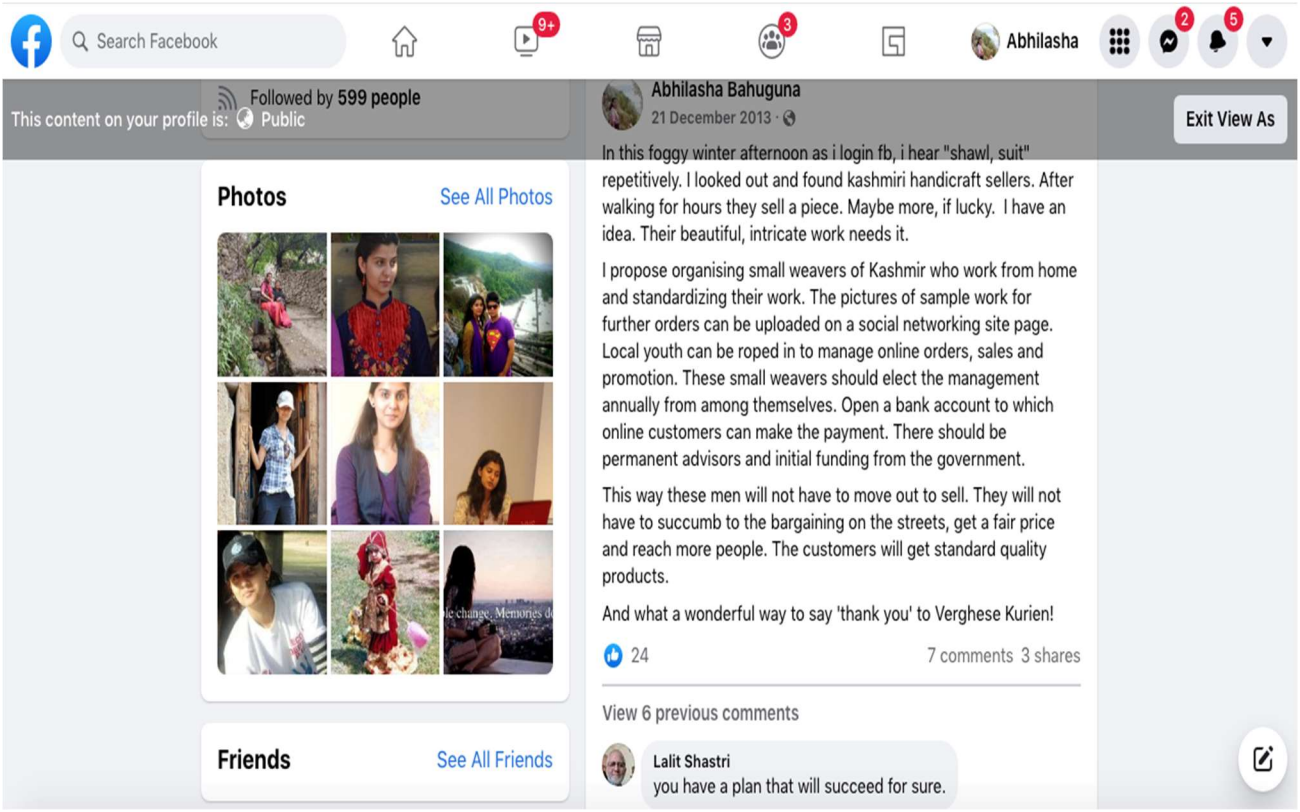
In 2021, LLWC was trying to increase their e-commerce presence and grow their business with online retailers, and create their own online brand. Bahuguna shared her concerns at the time:

> Similar and at times even lower grade material is fetching a very high price in the international market just because they are associated with big design houses. We have a lack of understanding of this niche market, as not many studies are done in this area. We need to first increase our digital presence for brand recall value and need a more scientific, holistic yet a flexible approach to meet our targets and launch our products in these competitive markets.

To meet their objectives, LLWC began to collaborate with established online retailers such as Okhai. LLWC also began talks with a few design houses and a marketing firm to build their brand and develop ideas on best-selling designs. From a planning perspective, before every launch of a new collection, Bahuguna, Raj, and Parmar would gather data on raw material availability, requisite resources, and lead time for the launch. The collaboration with online retailers was not straightforward for LLWC, as they had strict deadlines and required a minimum number of stock keeping units (SKUs) under each product category before the launch. Given the limited resources and raw materials, Bahuguna and the team were unsure about the best way to factor in and optimize these during each launch. For the Okhai launch, Parmar managed to put together the details of available raw material, knitters, and weavers (see **Exhibit 5**) and the minimum SKU requirements from Okhai (see **Exhibit 6**). The availability constraints and launch requirements led to the challenge of whether to focus on maximizing the use of available raw material, minimizing use of resources, or simply maximizing their profits. Bahuguna wondered if there was a spreadsheet model that would provide an optimal product mix and help schedule the various activities before each launch.

Exhibit 1

Facebook post by Abhilasha Bahuguna on the Artisans of Ladakh



Source: Facebook post shared by Abhilasha Bahuguna

Exhibit 2

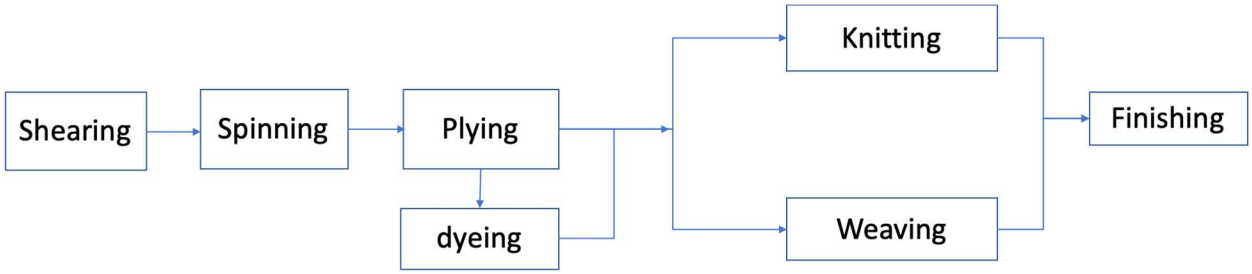
Women Artisans being Trained and Selling Products at Looms of Ladakh Store in Leh

Exhibit 2 (Continued)

Source: https://dwarkaparichay.com/blog/looms-of-ladakh-inspiring-world-throug/

Exhibit 3

Process Flow Diagram of Various Activities involved in Garment Production



Source: Created by the authors based on information shared by the company

Exhibit 4

Raw Material, Time, and Labor Cost Incurred for Various Looms of Ladakh Products

Product	Raw material needed in gms/product	Amount of work carried out per person per day in g				Per g labor cost in INR (₹) for each process step per product				Total dyeing cost in INR (₹) per product
		Spinning	Plying	Weaving	Knitting	Spinning	Knitting	Weaving	Finishing	
Shawl	510	21.5	250	500	NA	3.00	NA	1.46	0.60	830
Stole	390	21.5	250	500	NA	3.00	NA	1.79	0.60	635
Scarf	210	21.5	250	500	NA	3.00	NA	3.00	0.60	342
Sweater	320	37.5	500	NA	50	3.00	3.00	NA	0.60	488
Muffler	175	37.5	500	NA	50	3.00	3.00	NA	0.60	285
Cap	75	37.5	500	NA	50	3.00	3.00	NA	0.60	122
Gloves	73	37.5	500	NA	50	3.00	3.00	NA	0.60	119

Source: Created by the authors based on information shared by the company
***NA- Not Applicable**

Exhibit 5

Raw material available for Okhai launch

Product type	Raw Material Available	Resources Available
Knit	23Kg	13 Knitters
Woven	15Kg	5 Weavers

Source: Created by the authors based on information shared by the company

Exhibit 6

Minimum Number of Units needed for Okhai Launch

Shawl	Pashmina Weave	2
Stole	Pashmina Weave	5
Scarf	Pashmina Weave	10
Sweater	Pashmina Knit	2
Muffler	Pashmina Knit	4
Cap	Pashmina Knit	5
Gloves	Pashmina Knit	5

Source: Created by the authors based on information shared by the company