

## **Crafty dilemma: adapting Phulkari for the market**

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**Abstract:** In this paper I show one instance of how a traditional embroidery technique of Punjab, phulkari, was adapted to meet some of the challenges posed by the market. I do this via a detailed examination of the design and production process for one of the types of good produced by a government enterprise in India in the early 1990s. Through this example I show some of the considerations that drive how traditional crafts are adapted to fulfill the requirements of the modern fashion industry. I show how constraints imposed on the design to meet production levels, market price, and organizational goals shaped the production technology used to create the finished good. This paper provides a novel contribution by showing how an economically sound craft-based development project could aid in the survival of the traditional embroidery of Punjab.

**Keywords:** Phulkari, development, PUNWAC, microeconomics

**Classification:** Research paper

## 1. Introduction

Hand printing to roller printing to digital printing; hand made cutwork to machine made to laser cuts. Fine hand embroideries replaced by crude versions, then to machine made embroideries and then computerized embroideries and then a mere illusion of embroidery produced by printing images on fabric.

Are traditional crafts doomed to be *unzeitgemässe* (untimely)? Can the market help to preserve, protect, and promote endangered crafts? While the literature provides a wealth of insight into reasons for decline of crafts and skills (e.g., because of the comparative advantages of modern production technologies (Jaforullah 1999); because of an increasing market tendency toward trend driven merchandise; because of the gendered nature of traditional crafts (O'Brian 1999); or because of the rising cost of the required physical inputs (Jain 1985)), relatively little space has been devoted to how traditional crafts and skills might be constructively adapted to the needs of the marketplace. Instead the literature is rife with examples of poor quality craft merchandise. Another common thread is one of workers being exploited and alienated, the fruits of their labor and tradition being expropriated by others. Indeed one might gain the impression that the market is inherently inimical to craft, and that craftworks produced primarily for their 'exchange value' are somehow innately inferior to those perceived as being produced almost solely for their 'use value', regardless of the physical characteristics of the craft artifact.

In this paper I show one instance of how a traditional embroidery technique of Punjab<sup>1</sup>, phulkari, was adapted to meet some of the challenges posed by the market. I do this via a detailed examination of the design and production process for one of the types of good produced by a government enterprise in India in the early 1990s. Through this example I show some of the considerations that drive how traditional crafts are adapted to fulfill the requirements of the modern fashion industry. I show how constraints imposed on the design to meet production levels, market price, and organizational goals shaped the production technology used to create the finished good. I conclude with a discussion of what determines when and how traditional craft techniques can have a comparative advantage relative to machine fabrication; what factors lead designers to choose or decline to incorporate traditional craft techniques; and what might be lost in the process of adapting traditional craft techniques to meet economic design constraints (specifically, what *human capital* (craft expertise) might be lost in the transformation?) I argue that the use and survival of traditional craft methods is more dependent on cost, time, consistency,

quality control, and other production characteristics than on idiosyncratic factors (e.g. the tendency of a population in a particular place and time to consume a type of craft good as a means of asserting ethnic or cultural identity.)

While scholars generally agree that Phulkari was initially produced by women working at home for the use of their family and as dowry gifts, after the 1850's it also became a valuable trade commodity in the wake of various exhibitions showcasing the native crafts of colonies acquired by the British Empire (Maskiell 1999). Indeed while it is reasonable to suppose that phulkari was traditionally produced primarily for its use value, Punjabi families were well aware that phulkari head coverings and other articles could be sold if money was needed in an emergency. The fact that it did have an appreciable exchange value was one of the reasons why it was a prized dowry gift, along with representing as it did a tremendous expenditure of labor on the part of female family members. Valuable dowry gifts tended to raise the prestige of the giving family.

### **Approach/methodology**

My approach is to examine the particulars of one phulkari-related product produced by the Punjab Women and Children Development and Welfare Corporation (PUNWAC), a government enterprise in Chandigarh, India and how the design and execution of the product worked to fulfill the goals of helping to perpetuate phulkari-type design, as well as provide income to women who might only be able to work from home. In this case the traditional handicraft had the comparative advantage of helping to continue at least some design elements of a cultural tradition, and also the comparative advantage of having small capital input requirements, and, given the technological innovation used, relatively low initial skill requirements, and low risk. (Development projects based on handicrafts are viewed as being low-risk due to minimal physical capital requirements and, in some cases, an existing base of human capital to draw on (Wilkinson-Weber 2004).) I examine how the product was designed to appeal to the market (features consumers wanted, price target to make it affordable); approach used instead of the traditional thread-counting method (i.e., the technology used to reduce the amount of labor needed to produce one unit of output); materials used and how they differed from traditional materials that would have made the traditional approach more difficult than in the past (i.e., cotton base with higher thread-count, etc.) In the course of this analysis I will draw on some of the tools of applied microeconomics, operations research, and policy analysis, considering the design process largely as a constrained optimization problem.

### **Organization of this paper**

The paper is organized as follows: section 2 provides some background on PUNWAC's goals and objectives, product design process, production process (including coordination with craftswomen), and marketing in PUNWAC; section 3 discusses the basic characteristics of phulkari, how phulkari designs were traditionally executed, the simple technical innovation used to make execution of phulkari designs provided by PUNWAC easier for craftswomen, along with some assessment of the input resources saved by using this technique; section 4 presents conclusions in the form of some generalizations that might be drawn from this particular experience together with implications for future efforts to promote the survival of crafts.

### **2. Product design and production at the Punjab Women and Children Development and Welfare Corporation (PUNWAC)**

In this section I give some background on PUNWAC's goals and objectives, product design, production (including coordination with craftswomen), and marketing in PUNWAC.

#### **Goals and objectives of PUNWAC**

PUNWAC was created in the early 1980s with the goal improving the wellbeing of women and children in Punjab by providing employment to women in cottage industries. It was envisioned that PUNWAC could create opportunities for women to work and earn outside income even if they could not leave their own homes due to family obligations or other constraints on mobility. In addition it was thought that by providing some marketing opportunities to the products of cottage industry PUNWAC could help to keep traditional crafts alive. This might help to address a concern that had been voiced by prominent political leaders such as Mahatma Gandhi and Jawaharlal Nehru (India's first Prime Minister), as well as noted designers such as Charles and Ray Eames, that India not lose this part of its cultural heritage.<sup>2,3</sup>

PUNWAC was headquartered in Chandigarh, Union Territory, and at its peak had 19 field offices across the state of Punjab. It was organized into three main sections: the Design Development Centre, responsible for designing craft goods to be sold at retail, either directly by PUNWAC or via other organizations; the Tailoring Production Centre, responsible for fulfilling demand for general sewing-related services (e.g., monogramming) from government institutions and private firms, and the Sale Outlet Centre, responsible for staffing and running the PUNWAC retail store, as well as promoting selected female entrepreneurs from the state of Punjab.

## **Product design, marketing, and the organization of production in the PUNWAC Design Development Centre**

The Design Development Centre was responsible for creating marketable designs that could be executed, either in whole or in part, by women working at home. It was also responsible for organizing, coordinating, administering the production of craft products. The Centre sourced all the raw materials needed for the production of the finished designs. Centre staff saw to distribution of patterns, sample finished goods, and the raw inputs to craftswomen, as well as for collection of the finished products and the compensation of the craftswomen.

### **General product design considerations**

The staff of the Centre was tasked to design products that would appeal to consumers, were feasible for women to produce at home with little or no prior training, and would be profitable enough to enable PUNWAC (a government enterprise) to provide its craftswomen with fair and reasonable compensation for their labor. This was difficult, and sometimes called for innovation in traditional production methods, as will be discussed in detail in section 3.

The Center designers tried to appeal to consumers by using durable and colorfast materials in designs that would combine traditional craft with modern sensibilities, say through the selection of fashionable color palettes, topical motifs, or modern layout of traditional motifs. The designers also tried to appeal through “cost engineering”, that is choosing materials, design, and production methods such that the combined cost of the labor and materials needed to fabricate the design would allow for a competitive market price for the finished product.

The products had to be scalable, that is, the staff had to create designs that could be produced in the hundreds or thousands by coordinating the work of tens or hundreds of women working independently. This had implications both for the types of inputs used in production as well as the complexity of the designs. PUNWAC had to be able to source the raw materials in sufficient quantity, which tended to rule out certain types of inputs (e.g., the hand-woven cloth traditionally used as a base for embroidery work). The designs initially had to be such that women with little or no formal craft training could execute them to a uniform specification, as highly trained craftswomen were in short supply. (As time went on PUNWAC’s activities resulted in an expanded pool of practiced craftswomen, and the Centre designers were able to introduce more elaborate designs.)

## **Marketing and consumer demand**

The finished products were sold at the PUNWAC outlet store, and were marketed by the staff designers at the annual National Trade Fair (Pragati Madan New Delhi) and other venues. The staff also conducted exhibitions throughout Punjab.

The finished products were also sold wholesale to distributors. Shortly after its founding PUNWAC became an approved source for the Punjab Small Industries & Export Corporation Ltd. (PSIEC). PSIEC was created in 1962 with the goal of providing marketing assistance to small-scale industries, and showcasing and developing handicrafts through training and marketing finished products. PSEIC has retail outlets in most major cities in India, as well as a web presence at <http://pseic.gov.in>.

The combined sales opportunities, both retail and wholesale, resulted in a typical requirement for hundreds or thousands of finished goods of a given design / product.

## **Organization of production**

PUNWAC interacted both directly with craftswomen and indirectly via agents who would provide the piecework to craftswomen in more remote locations of Punjab. After developing a design and determining an appropriate piece-rate for the product, the Design Development Centre would create a kit that would be given to each woman that would contain the pattern or design, raw materials, and, if appropriate, a sample of the finished good or intermediate product the craftswomen were expected to create. These kits would be distributed to the craftswomen or via their agent. The individual craftswoman or agent would return with the finished goods or intermediate products, which would then be inspected by staff; if the finished product fulfilled the requirements set by the Centre the craftswoman or agent would be issued payment.

Sometimes in the course of executing the design the craftswomen would discover that it took longer to complete than anticipated by the Centre. The women would request an increase in the piece-rate, either directly or via their designated agent. The Design Development Centre would adjudicate these claims and, if evidence warranted, increase the piece-rate for a particular design. Typically all prototype samples were made under direct supervision of PUNWAC staff so the exact time of execution could be determined. This information helped the Centre to decide on the

wage, which based on the time consumed for the production of a piece. Production time was generally proportionate to the “intensity” of the design element, number of embroidery strands used, number of colors to be coordinated, base fabric, etc. However, if some components were overlooked and the agent/artisan brought it up, the piece rate would be reconsidered. The standardized product designs were assigned code numbers / names and a standard approved rate. Only new designs had to go through the process for standardizing the wages.

### **3. Phulkari design fabrication: tradition and innovation**

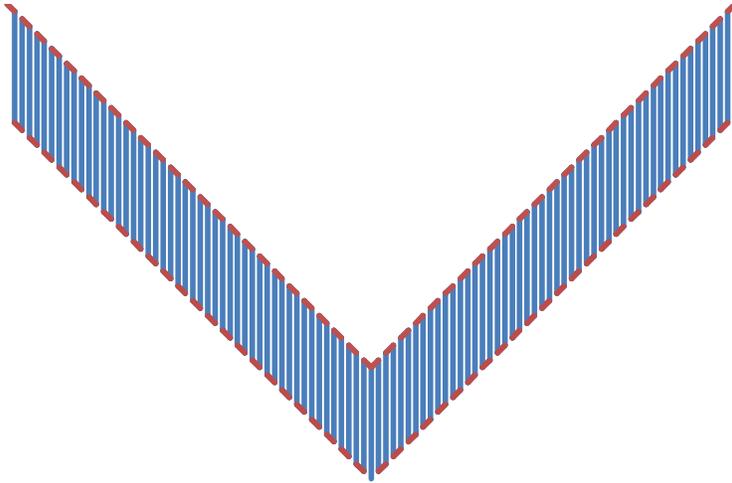
#### **Traditional technique**

Phulkari, like many traditional crafts, is highly labor intensive. The physical capital input requirement is relatively low: a base fabric (traditionally khaddar, a hand-loomed course-weave cotton cloth), a selection of colored threads (traditionally silk floss, although synthetic floss now sees wide use), an embroidery needle, and, optionally, a pattern or sample to work from. The labor required to produce a finished piece depends on the area of fabric to be covered and the number, length, density, and precision of the stitches required by the design. In some designs the density of the stitches is such that the base fabric is completely hidden, whereas in others geometric motifs may be islands in expanses of fabric. Depending on the design an individual item of phulkari may take from a few hours (say, for a sparsely embroidered scarf) to thousands (as in a traditional *bagh*, where the base fabric is completely hidden.)

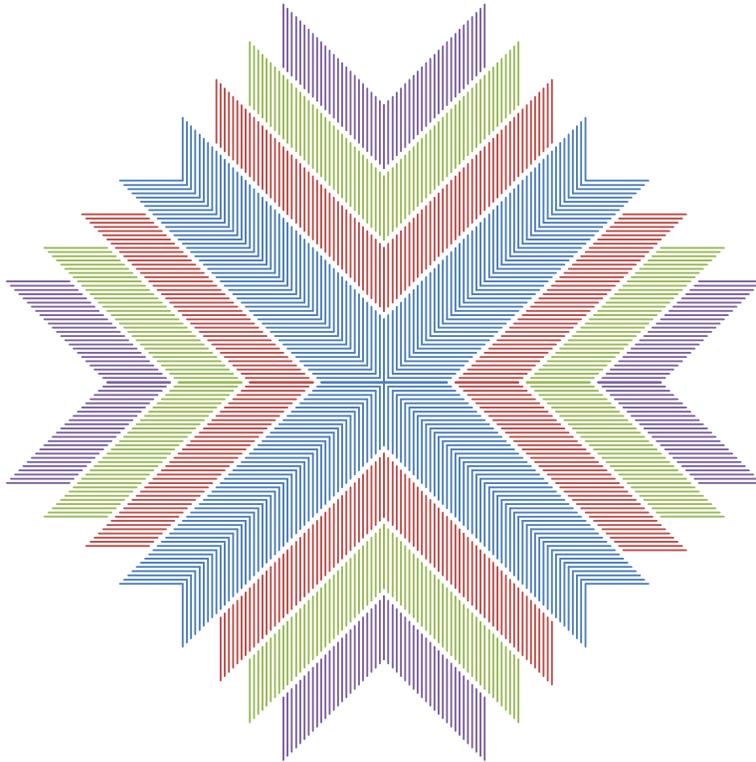
The humble darn stitch serves as the foundation for the work, although more elaborate stitches may be used in the borders, to demarcate spaces in the design, or strategically to hide seams where individual pieces of the base fabric have been joined together. Darn stitches are combined to form geometrical patterns. Figure 1 shows a schematic of how the darn stitches are combined as an x-ray view from the “wrong” side of the fabric, where red indicates the thread that is visible from the “wrong” side, and blue indicates the thread that is visible from the “right” side. An individual stitch typically consists of four or six lines of thread that are drawn through by one operation of the needle, that is, two or three individual lines of floss are drawn through the eye of the needle and folded before the needle is passed through the fabric. Thus the discrete lines in the schematic will appear as a solid expanse of color in an actual piece of phulkari, given an interesting texture, shading, and sheen by the floss thread.

The basic geometric design element shown in Figure 1 is repeated and scaled, translated, and rotated to form one of the more common motifs, a phulkari “flower”. A schematic of a typical example is shown in Figure 2.

**Figure 1 – A Typical Basic Phulkari Design Element**



**Figure 2 – A Common Phulkari Motif Built by Scaling, Translating, and Rotating a Basic Design Element**



The labor required to produce a work of phulkari should not be underestimated; the simple flower motif shown in Figure 2 consists of 1086 individual stitches, taking at least 2172 discrete needle operations to execute, and might take even a highly skilled craftswoman the better part of an hour to complete.

Along with the number, length, and density of stitches, the precision required to execute phulkari in the traditional manner contributes to the amount of labor required. The position and length of the stitches is determined by counting the number of threads in the underlying base fabric. Thus the grid provided by the weave of the base fabric provides the coordinate system the craftswoman uses to navigate over the fabric. Evidence of this can be seen in Figures 3 and 4, which show phulkari-work used to decorate the fabric of a woman's vest. Figure 3 shows a front detail of the embroidered fabric, and Figure 4 shows the corresponding back detail. The larger design elements are built out of individual stitches that cross 13 horizontal or vertical threads of the base fabric in the vertical or horizontal stitching on the front, and cross one horizontal and one vertical

thread in the diagonal stitching on the back. So each following stitch of a diagonal swath is painstakingly positioned immediately adjacent to and offset by one width of the base material thread. The smaller design elements are also created in a similar manner. The beginning of each diagonal swath must either be preceded by a thread-counting operation (either by sight or by feeling movement as a needle is drawn along the fabric) or by gauging the appropriate stitch length from another design element already embroidered on the fabric. Each immediately adjacent stitch can be gauged from the preceding stitch; since the fabric is typically worked from the “wrong” side this amounts to locating the right place for the small diagonal stitch, which will be one thread adjacent and one thread offset from the preceding small diagonal stitch. This operation, while seemingly trivial, takes a great deal of care to execute with the consistency needed to render the precise geometric motifs used in much phulkari. Inconsistency in the line of stitches will tend to weaken the overall aesthetic effect.

**Figure 3 – Detail of Woman’s Vest, Showing Typical Phulkari Work Executed Using Traditional Methods**



**Figure 4 – Reverse Side of Woman’s Vest Detail, with Lining Drawn Back to Show Execution Details**



### **Innovation at PUNWAC**

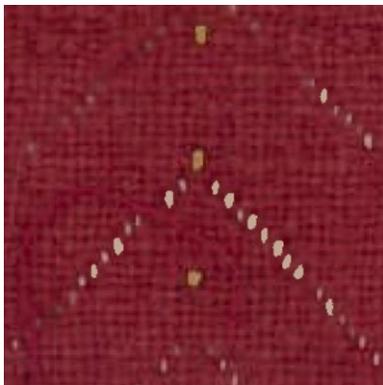
Designers at PUNWAC wanted to create phulkari products that would come in at low enough prices to be salable, and could be produced by workers quickly enough to provide the workers with attractive compensation. This led to some innovation in the traditional way that phulkari was produced. The designers thought that the task of the craftswomen could be made much easier by inking a pattern to follow on the wrong side of the fabric, rather than having the women count threads in the traditional manner.<sup>4,5</sup> Thus the women would avoid the counting and gauging activities endemic in traditional phulkari. This might lead to some loss in the perceived precision of the executed work, but the gain in productivity was judged to be worth the loss.

In addition to reducing the work needed to execute a traditional phulkari design, using patterns also freed the designers to choose a base fabrics that otherwise would not be suitable for phulkari. PUNWAC staff recognized that sourcing a sufficient quantity of the traditional hand-woven base

fabric would be problematic. In addition they wanted to be able to use a base fabric with different affordances than the traditional material; it should be color-fast, even more durable, have a soft hand, easier to clean, and suitable for upholstery applications. Traditional khaddar is a hand-loomed, relatively loose-weaved fabric that is available at a lower thread count per inch than the typical machine-woven tight-weave fabric. Figure 5 shows a magnified swatch of the base fabric used in the vest shown in Figures 3 and 4. It runs at 32 to 33 threads per inch. The low thread count and loose weave makes the threads easier to count; a higher thread count and tighter weave would makes the task more difficult and time consuming, and traditional motifs would have to be scaled appropriately to account for the change in distance corresponding to crossing a certain number of threads.

Using patterns enabled the designers to specify a machine-woven base fabric. A swatch of a typical example used in cushion covers at PUNWAC is shown in Figure 6. Cursory examination of the fabric shows that the thread count is roughly double that of traditional khaddar.

**Figure 5 – One Square Inch of Traditional Base Fabric, Magnified 2x**



**Figure 6 - One Square Inch of Cushion Cover Fabric Used at PUNWAC, Magnified 2x**



PUNWAC staff stacked up to 100 pieces of pre-cut cushion fabric panels interleaved with carbon paper, or similar duplication material, and traced the design so that a light version of the pattern was imprinted on the base fabric. Ten pieces of the patterned fabric were then put into kits that included needles, floss thread, and either a paper pattern indicating the colors to be used in the design or a completed sample to work from. Figures 7, 8, and 9 show examples of the work produced by PUNWAC; some of the samples in the author's collection (not shown) still show remnants of the tracing on the wrong side of the fabric.

**Figure 7 – Upper-Right Quadrant of a Cushion Design Used at PUNWAC**



**Figure 8 – Upper-Right Quadrant of Another Cushion Design Used at PUNWAC**



**Figure 9 – Back Side of Cushion Cover**



**The underlying economics of PUNWAC’s technology choice**

PUNWAC’s choice of production technology was driven by economic considerations and the underlying goals of the organization. PUNWAC, as a government enterprise, was not primarily designed as a profit-making entity; it was instead designed to foster economic development among women in the PUNJAB by providing them with cottage industry work that they could do from home in exchange for an attractive wage. PUNWAC thought it would be best to target its market with reasonably priced home goods that used traditional craft in their manufacture. The constraint on the market price was passed through as a cost constraint on production. This constraint, in combination with the cost of raw materials and the available technology, determined the wage it would be feasible to offer to the craftswomen whose economic lot PUNWAC was attempting to further.

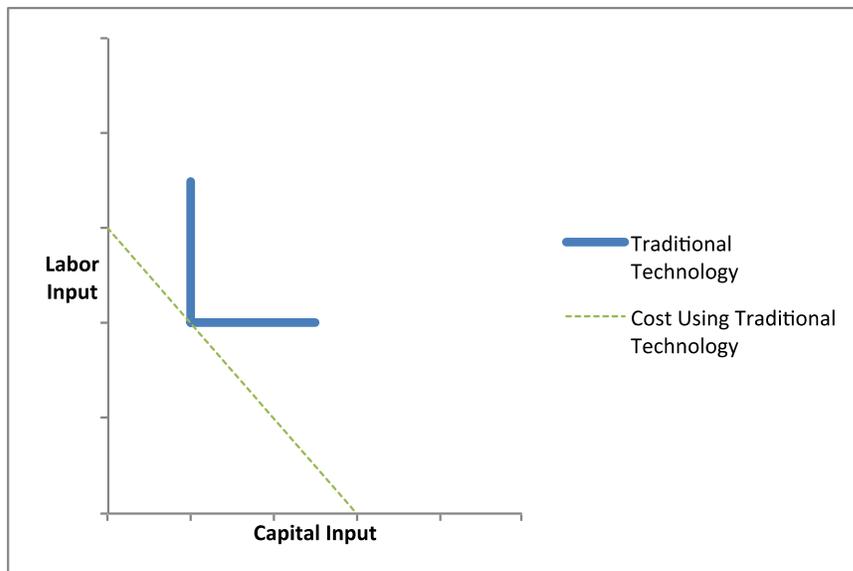
What follows below is a simple, conceptual economic model of what was going on. I model the phulkari production as a fixed-proportions technology; that is, production of a unit of output under a given technology requires, at minimum, some minimum amount of capital and labor. This can be represented by the equation

$$y_1 = \min \left( \frac{L}{a_1}, \frac{K}{b_1} \right)$$

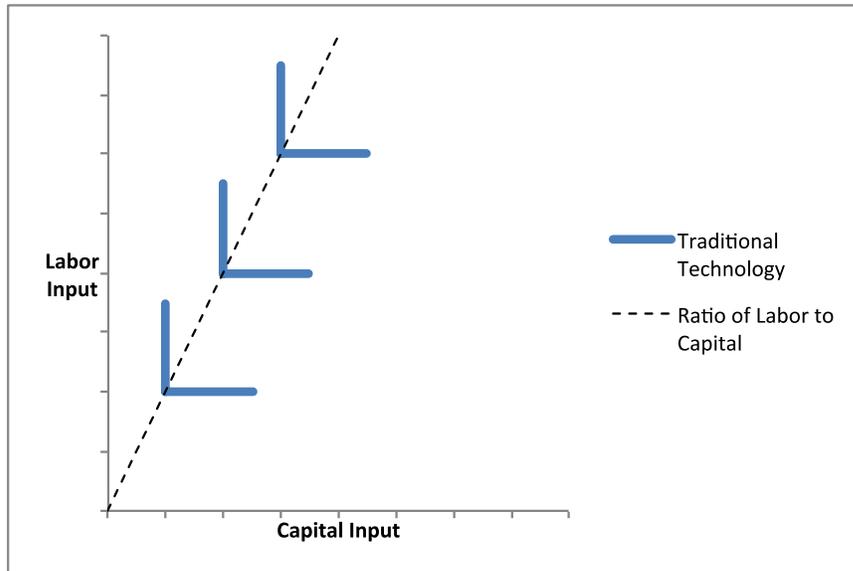
where  $y_1$  is the amount of output, and  $a_1$  and  $b_1$  are the amounts of labor and capital required to produce one unit of output. Figure 10 shows a graphical representation of the traditional technology, where the blue “L” shape corresponds to the amounts of capital and labor required to produce one unit under the traditional technology, and the green line represents the cost / budget line under the wage desired by PUNWAC. The “L” shape is called an isoquant in economics, or a level set in mathematics, and is directly analogous to the lines indicating terrain height on a contour map. The intersection of the cost line with the horizontal axis shows the total cost of one unit of output in terms of units of the capital input under the traditional technology at these relative prices for labor and capital. The slope of the cost line reflects the relative prices of labor and capital; if labor were less costly (that is, if PUNWAC’s desired wage was lower), the slope would be steeper.

Figure 11 shows the isoquants corresponding to production of one, two, or three units of output, showing that this technology exhibits constant-returns-to-scale.

**Figure 10 – An Isoquant Corresponding to One Unit of Output in a Fixed-proportions Technology**



**Figure 11 - Isoquants Corresponding to One, Two, and Three Units of Output in a Fixed-proportions Technology**



In Figure 12 the red isoquant represents the alternative technology used by the craftswomen working for PUNWAC. This technology needs a slightly higher capital investment per unit – the pattern traced on the material to be worked, but a much lower labor investment due to the time saved by avoiding counting operations and more laborious navigation required when working only from the grid provided by the base fabric. The cost savings per unit produced is reflected by the new cost / budget line implied by using the alternative technology; this new line intersects the horizontal axis closer to the origin of the graph, and thus means that the total cost is lower at these relative prices for labor and capital.

**Figure 12 – An Alternative Technology Could Yield Cost Savings at these Relative Prices for Labor and Capital**

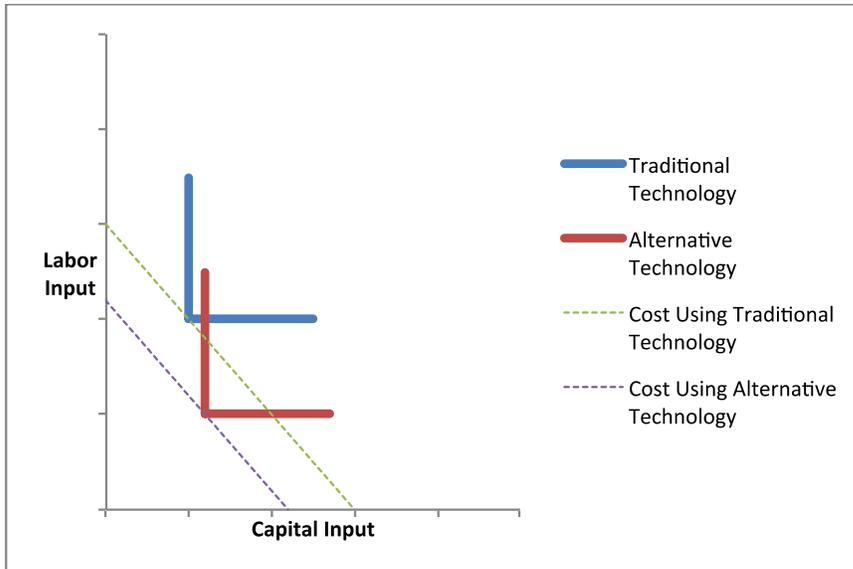
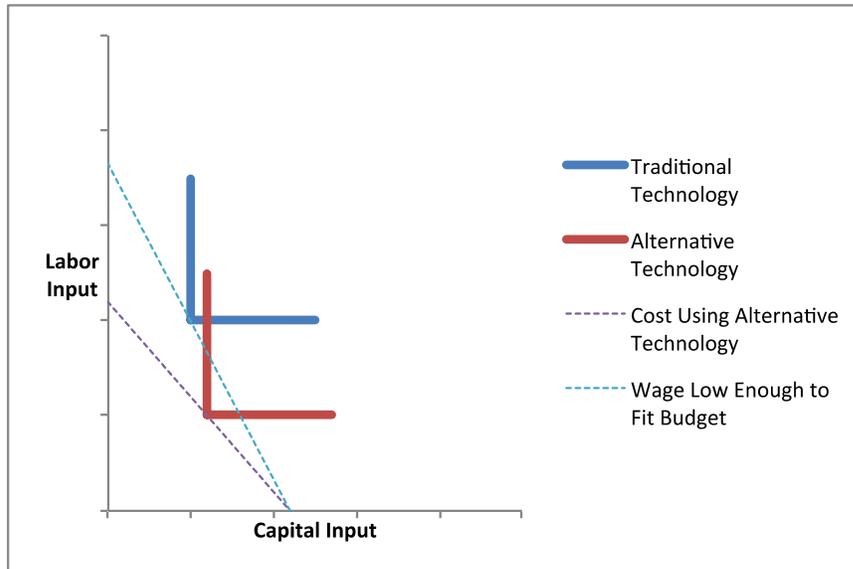


Figure 13 shows the wage implications if PUNWAC had used the traditional technology in production but still wanted to meet the lower cost. Since PUNWAC is a price-taker in the market for the physical inputs (thread, fabric, needles) it could only attain a lower cost by reducing the wage of the workers. The more steeply sloped dashed line in Figure 13 shows the cost / budget line implied by meeting the cost constraint using traditional technology; the only way to meet the constraint would be to lower the wage of the workers. In this graphical example the wage would be about 40% lower, which can be seen by inspecting the ratio of the points at which the two different budget lines intersect the vertical axis of the graph, where a higher point of intersection corresponds to a lower wage.

**Figure 13 – Using the Traditional Technology Would Require a Lower Wage for the Craftswomen**



#### **4. Discussion and concluding observations**

Generalization: Goals do not determine solutions, constraints do.

By using an alternative technology PUNWAC was able to meet its goals of producing marketable phulkari goods in quantity and also providing an attractive wage to craftswomen working from home. At its peak PUNWAC provided gainful employment to over 500 women in Punjab. In addition PUNWAC's efforts resulted in an increase in the human capital in Punjab; because the designs were accessible to women with little or no experience in craft, they could use them to teach themselves some of the basics of phulkari embroidery.

However not all aspects of phulkari craftwork were preserved in the transformation; the traditional thread-counting technique was lost. Some might argue that the perceived precision of the resulting craftwork is inferior to that yielded by traditional methods. Nevertheless the human capital developed in this project was directly applicable to traditional phulkari production, and thus it offered a means and incentive for development of some of the skills required by the traditional techniques for executing this craft.

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<sup>1</sup>The geographic area traditionally identified as Punjab now spans several states or provinces in both India and Pakistan. In India this currently includes the states of Punjab, Haryana, Himachal Pradesh, parts of the Jammu Division in Jammu/Kashmir, and Rajasthan, the city of Chandigarh (a Union Territory), as well as parts of the city of Delhi. In Pakistan this currently includes Punjab province and parts of the Islamabad Capital Territory, Khyber Pakhtunkhwa (formerly the North-West Frontier Province or NWFP), and Azad Kashmir. A significant diaspora population of Punjabis has been now been resident for a century or longer in Canada, the United States, and the United Kingdom.

<sup>2</sup>Eames, Charles and Ray, *The India Report*, National Institute of Design: Ahmedabad, India, 1958.

<sup>3</sup>McGowan (1993) gives an insightful critical appraisal of the utility of this type of discourse to political figures in India.

<sup>4</sup>Patterns or drawings were sometimes used in traditional phulkari to aid in rendering images from nature or daily life or indeed anything that could not be rendered using rectilinear or diagonal geometric design elements.

<sup>5</sup>Use of patterns to produce traditional geometric-motif phulkari has become much more prevalent over the two decades since the events recounted in this section. Some producers in Patiala commonly use block printing to emboss patterns on the base fabric, and at least one firm is now producing completely machine-fabricated phulkari. (Jatinder Sohi, personal communication to the author.)

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