

A Sustainable and Zero Waste Approach to Ready-to-Wear

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**Contextual Review and Concept.** The Bhagalpur Chadar is a 100% single cocoon, Tussar silk hand loomed in Bhagalpur, the silk state of India. The Tussar silk is one of the three saturated wild silks; Tussar, Muga, and Eri. Tussar silk is cruelty-free as the silkworm metamorphoses into a moth and crawls out of the cocoon. Tussar silk is less expensive and more durable than cultivated silk, thus making it machine washable in medium to low temperatures (Vigneswaran et al., 2015). The serviceability properties of fabrics made from this silk are coarse texture, light to medium weight, soft drape, dull luster, high cover, hydrophobic, breathable, feels cool to the touch, and low level of thermal retention making it favorable in hot weathers (Cao & Wang, 2009; Wang et al., 2006). This fiber is used in high fashion clothes, pajamas, robes, sun dresses, and Eastern folk and ethnic dress to name a few (Vigneswaran et al., 2015). In the ready-to-wear industry, cut-and-sew garment production is the most common method of manufacturing apparel that result in 15% fallout (Rissanen & McQuillan, 2016). Fabrics are sophisticated textiles, particularly those made of natural fibers and hand loomed have high economic value. It is in the manufacturer's best interest to utilize the most of the fabric and to minimize fallout from the design and manufacturing process. Zero-waste is one method to minimize fallout and it is defined as "fashion design that wastes no fabric, by integrating pattern cutting into the design process" (Rissanen & McQuillan, 2016, p. 11). Zero waste designs are evident in ethnic dresses such as kaftans, kimonos, and saris where the emphasis is made on the textile surface design and fabric properties (Eicher & Evenson, 2014). None of these styles provide tailored fit that is desired in Western dress. It is a challenge for designers to create zero waste garments to meet the needs of Western culture (Bernardoni, 2022). Therefore, the purpose of this project was to design and develop a sustainable and comfortable dress that meets the needs of the Western working women. The objectives were to 1. develop a pattern that is easily manufactured in apparel mass production with simple sequence of operation, 2. have minimum fallout, and to 3. utilize a natural fiber that has unique serviceability characteristics such as aesthetics, care, and comfort.

**Aesthetic Properties and Visual Impact:** This tunic dress is developed around the elements and principles of design such as color, line, and balance to achieve a unique design. The color pallet is *split complementary* with tinted green, red, and red-violet appearing as olive green, pink, and lilac. These colors represent peace, romantic and nostalgic feelings, and denote feminine qualities (Feisner & Reed, 2013). The dress is balanced and contains "symmetry in shape and

color” (Butler et al., 2003, pp. 190-191); pastel colors go well together as they are toned down from their saturated hue and the dress brings a perfect balance of parts. There is a color repetition on the horizontal axes and a continuation of line on the vertical axes creating rhythm for the viewer (Volpintesta, 2014).

**Process, Technique, and Execution.** The fabric was the source of inspiration as it set the mood for the dress design. The stripes were parallel to the selvage of the fabric with dimensions suitable for a maxi length dress (W:120 cm x L:300 cm). Furthermore, the fabric’s cooling properties made it suitable for a summer dress and for females who are sensitive to heat and are generally hot natured. The ideation evolved around three criteria: minimum fallout, simple construction making it suitable for mass production, and serviceability properties such as aesthetics, care, and comfort. The implementation begun by a pattern block which was “modified by the tunic setup developed from examples found throughout history” (see figure 1.) (Rissanen & McQuillan, 2016, p. 71) The scoop neckline was marked with French curves and cut out. Fringe on one side of the fabric was removed to construct the waist seam. The shoulder line was marked 30 cm away from the waistline, the second mark was the sleeve seams again placed 30 cm away from the shoulder line (see Figure 1). Once the top was cut and sewn with half inch seam allowance, the remaining fabric determined the length of the skirt (220 cm) which was then sewn at the waistline with a seam at the center back. The stripes were matched at the waistline, at the sleeves, and at the center back seam making an uninterrupted continuous flow. The fringe on the opposite side was kept as it landed on the hem of the skirt giving it a natural finish. Air circulation is obtained from the scoop neckline, the wide sleeve hem, and the slit at the center back of the skirt. The fabric is naturally cooling

**Cohesion.** The purpose of this design project was to develop a suitable dress for the working female in Western cultures. This dress is cut loose and maxi length making it office-friendly and flattering for a date night, simultaneously. The objectives were to have no waste that was achieved with a zero-waste approach. The 100% Bhagalpur silk fabric provides cooling and comforting sensations. Additional air circulation is obtained from the scoop neckline, the wide sleeve hem, and the slit at the center back of the skirt. The fabric is naturally cooling Given the softer texture, durability, and easy care of this fabric, the product offers unique serviceability characteristics. The pattern for cutting the fabric is give simple and easily mass-produced for a wider market.

**Design Contribution.** This design project represents a zero waste approach to mass production. The current dress is loose in style accommodating multiple size ranges (Rissanen & McQuillan,

2016). With narrower widths of fabric, smaller sizes and shorter sleeve lengths can be obtained. Given that in mass production, garment parts are cut out of a fabric bulks, the length of the dress can be controlled to vary from a crop top to a maxi length tunic dress. Furthermore, this project demonstrated the application of a sustainable fabric, Bhagalpur Chadar, in garment construction. The application of this fabric is vast as it can be used in various garments for any target market that desires comfort and sustainability in their apparel. Future designs, should incorporate more design details such as pockets or front openings by utilizing the length of the skirt.

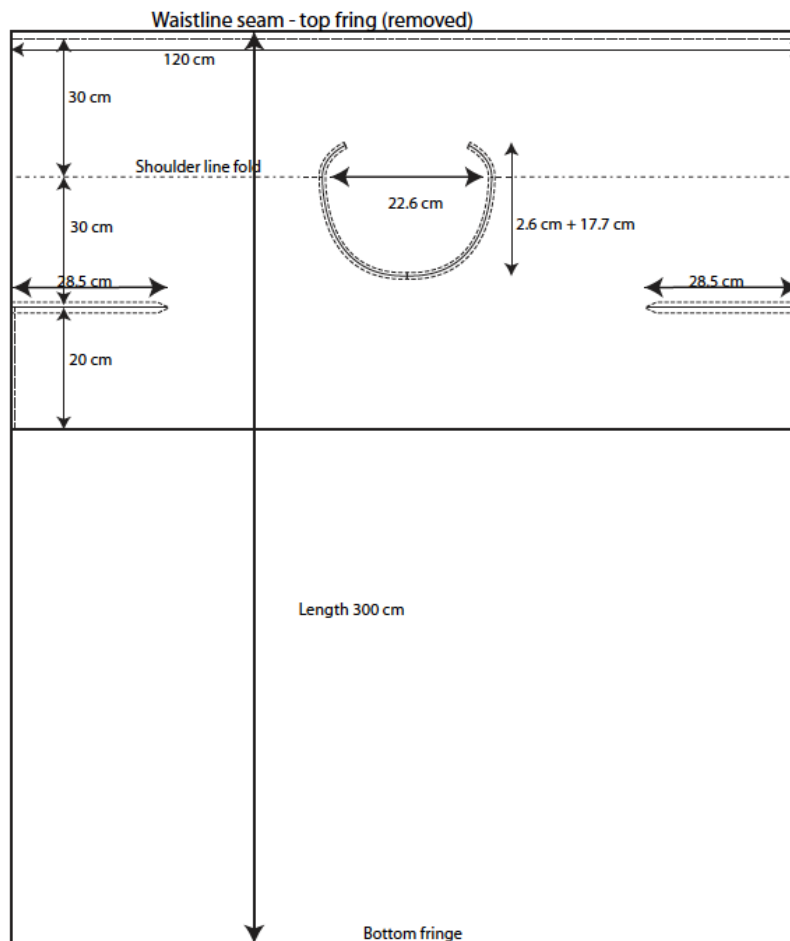


Figure 1. Selvage to selvage width 120 cm and total length 300 cm

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