From Waste to Textiles

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The exploration of the potential application of rice straw waste in the development of eco textile design solutions.

Michelle Macky

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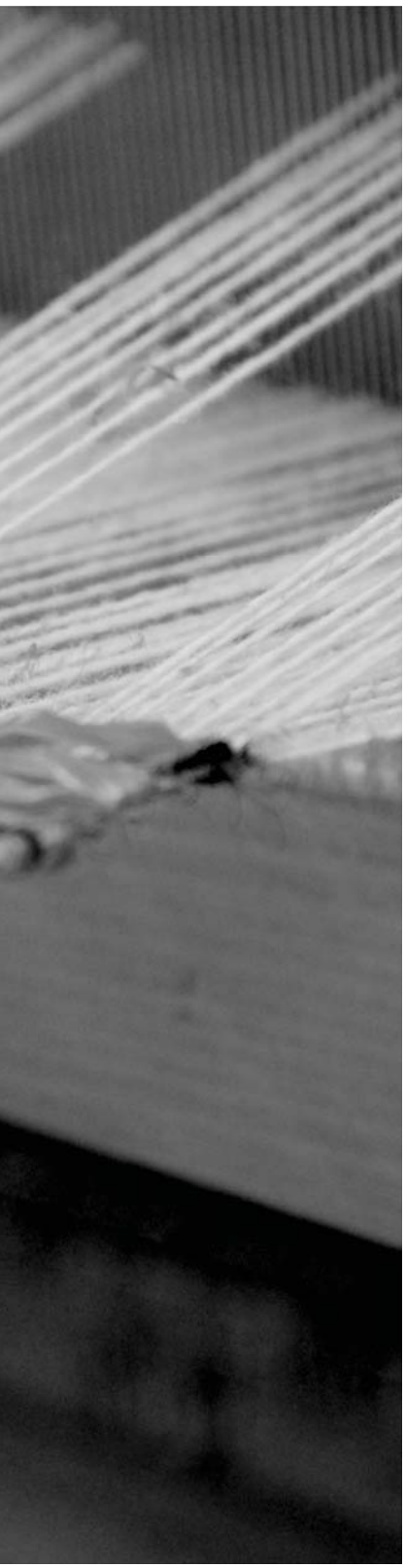

Warp

“a set of vertical yarns that are held in tension on a frame or loom.”

Weft

“a set of horizontal yarns that fill the weave structure.”

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Due to commercially sensitive information within and requested by The Formary, this exegesis has been embargoed from the public until December 2015.

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1. Strong wool - characteristic of crossbred sheep producing coarse fibred wool.
2. Retting - process of using moisture to aid in the separation of fibres from the plant e.g. flax and straw.

abstract

With the world's population predicted to grow by another two billion people within the next forty years (United Nations, 2013) the demand for arable land space for agricultural food production will increase rapidly. This in turn will result in an increased volume of waste fibre. The availability of land to produce virgin fibre-only crops is limited. Companies and designers are beginning to use non-traditional innovative approaches to utilise the fibre from agricultural food production or renewable sources. The Formary have placed themselves amongst these companies and have an aim to reduce the need for virgin fibre-only crops, freeing up valuable land space for food production.

The Formary are developing ways to convert fibre waste from agricultural food production into viable and marketable fabrics, "by transforming waste through good design" (The Formary, n.d.).

The Formary developed a relationship with the Chinese Government in 2011, while on the Wellington City Council's Mayoral Delegation to China, approaching them with an idea to use rice straw fibre from the 33% of unused waste.

In 2012, a collaborative partnership between The Formary, Dr. Sandy Heffernan of Massey University's Textile department and Wool Yarns Ltd led to the development of a prototype yarn, using a blend of rice straw waste and New Zealand strong wool[1]. Funding provided by Callaghan Innovation enabled this investigation to further the research into using rice straw waste fibre as a textile material.

The overall research had two key requirements. The first requirement was undertaken by Dr. Gaile Dombroski who researched the technical processing of the rice straw into a viable yarn using different retting[2] processes. This research and design development focuses on the second requirement, investigating design processes that can use rice straw waste as a fundamental material.

The key goal was to use an optimal ratio of rice straw waste to develop innovative, distinctive and viable fabrics.

Fabric experiments were constructed through the reinterpretation and development of traditional textile woven and non-woven techniques. The traditional textile construction process of weave has been comprehensively investigated and experimented with to develop the use of the rice straw and wool yarn within a textile structure. The non-woven textile technique of felting was also incorporated into this research as it offered an opportunity to increase the percentage of rice straw used. It also created a unique way to bind the rice straw and wool fibres together. Both textile processes have added value to the rice straw fibre by highlighting its natural properties, with the intention of producing innovative, high end, marketable fabrics as alternatives to current forms of disposal.

This research depicts the partnership that was formed between The Formary and myself and progresses through my journey to shape the development of using the rice straw waste within textile design.

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