



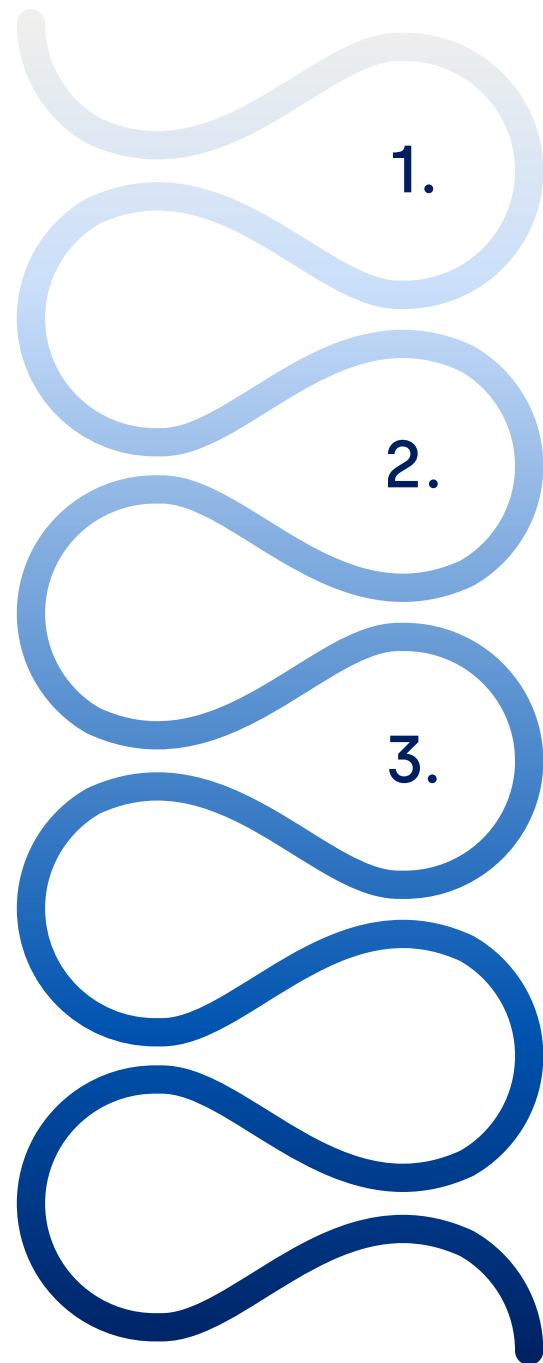
A REFERENCE FOR WATER CONSUMPTION DURING INDIGO DYEING

Executive Summary

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- 1. What makes an indigo dyeing process “sustainable?”
- 2. What is the average amount of water used to dye denim today?
- 3. And what would qualify as a laudably low amount of water, or an excessive amount of water that indicates a mill needs to update its equipment and processes?

The answers to these seemingly basic questions — given in marketing campaigns, sustainability reports, and pitch decks — have varied widely and been based on **outdated and incorrect information**, opening the door to *greenwashing* by fashion companies, equipment manufacturers, dye startups, and denim mills.

In short, mills currently can say *whatever* they want to brands about water savings, because there is **no way to verify those claims** or a benchmark to compare them to.

The Transformers Foundation, the denim supply chain platform and think tank for ethics and sustainable innovation in the jeans industry, believes there should be a universal benchmark by which to measure sustainability in denim production.

2023

So in August of 2023, we started discussing this idea with mills...

...and in February 2024 we formed the **Indigo Council** to study the issue and establish industry standards.

2024

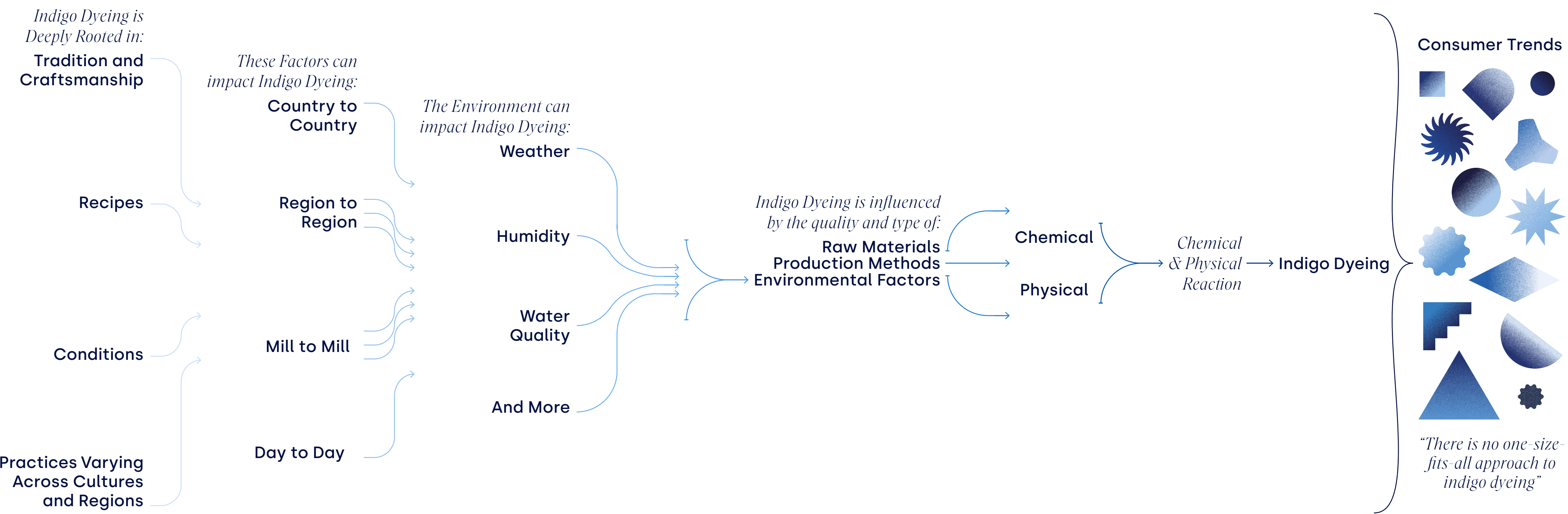
Indigo dyeing is a long and complicated process...

For the first study in what could be a series we looked at water usage in the indigo dye process.

Our task wasn't easy. **Indigo dyeing is a long and complicated process** that involves both *chemical* and *physical* reactions, and is influenced by the quality and type of raw materials, production methods, and environmental factors such as weather, humidity, water quality, and more.

These factors can vary not only from country to country or region to region but from mill to mill, and even day to day within that same mill. Moreover, indigo dyeing is deeply rooted in tradition and craftsmanship, with recipes,

conditions, and practices varying across cultures and regions. Add in the ever-changing expectations and trends of consumers, and you see that there is no one-size-fits-all approach to indigo dyeing.
[See diagram below.](#)



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Our research is an attempt to address this complexity and create an adaptable yet sturdy open-source methodology that can adjust to the many conditions and practices inherent in indigo dyeing.

The primary objective of this pioneering study was to define, establish, and validate a reference standard for conventional or standard dyeing of denim warps. We hope that it serves as an industry benchmark against which claims regarding water consumption for new coloring processes or technologies can be compared.

Without further ado, our results are as follows:

The initial water consumption for the pre-dyeing is almost the same for all the mills in our study. Variability is in the water used in the post dyeing boxes for rinsing and washing.

The average quantity of water used for washing and rinsing ranged from 15 to 20 L/kg for rope dyeing and 10 to 15 L/kg for slasher dyeing. Implementing best practices may

decrease this amount to as low as 3.85 L/kg for rope dyeing and 3.40 L/kg for slasher dyeing.

Indigo efficiency - meaning the percentage of indigo remaining on the yarn at the end of the dyeing process - for rope dyeing should be between 93% to 95%, while for slasher dyeing it should be between 85% to 94%.



Indigofera tinctoria from Flore d'Amérique, vintage botanical illustration. Sourced from rawpixel.

Visualising our results...

