

National University of Public Service

**Transformation and use of lignin
from black liquor as a flocculating
agent in wastewater treatment**

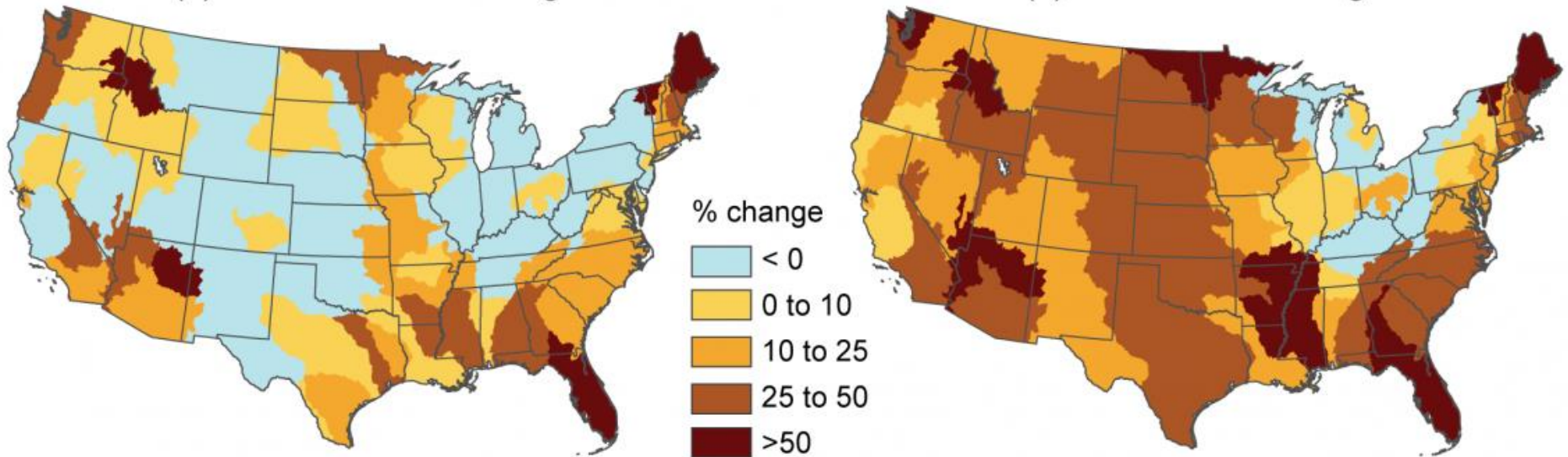
Matias Mallmann Rohde, Research Fellow



Projected Changes in Water Withdrawals

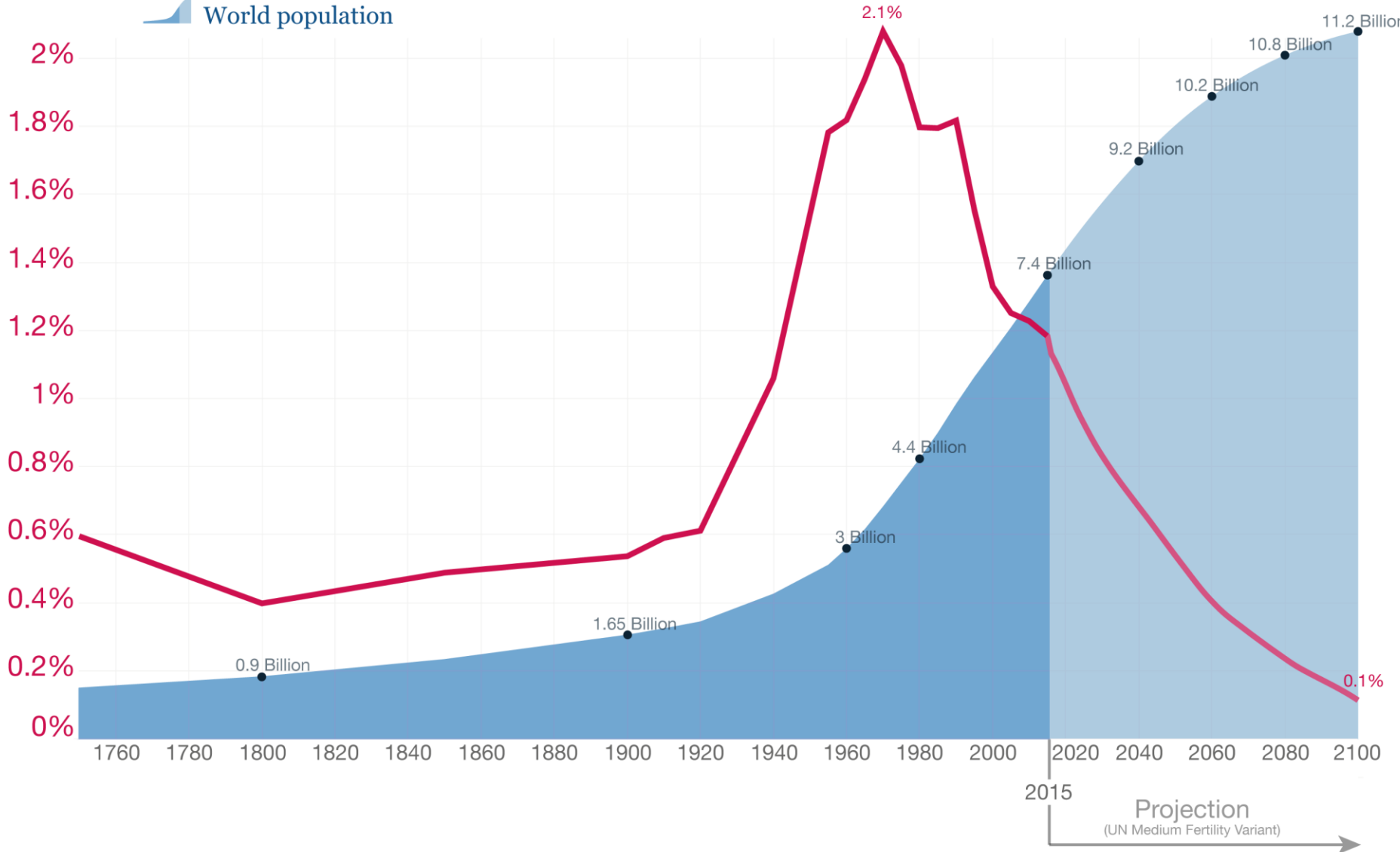
(a) Without Climate Change

(b) With Climate Change



World population growth, 1750-2100

 Annual growth rate of the world population
 World population

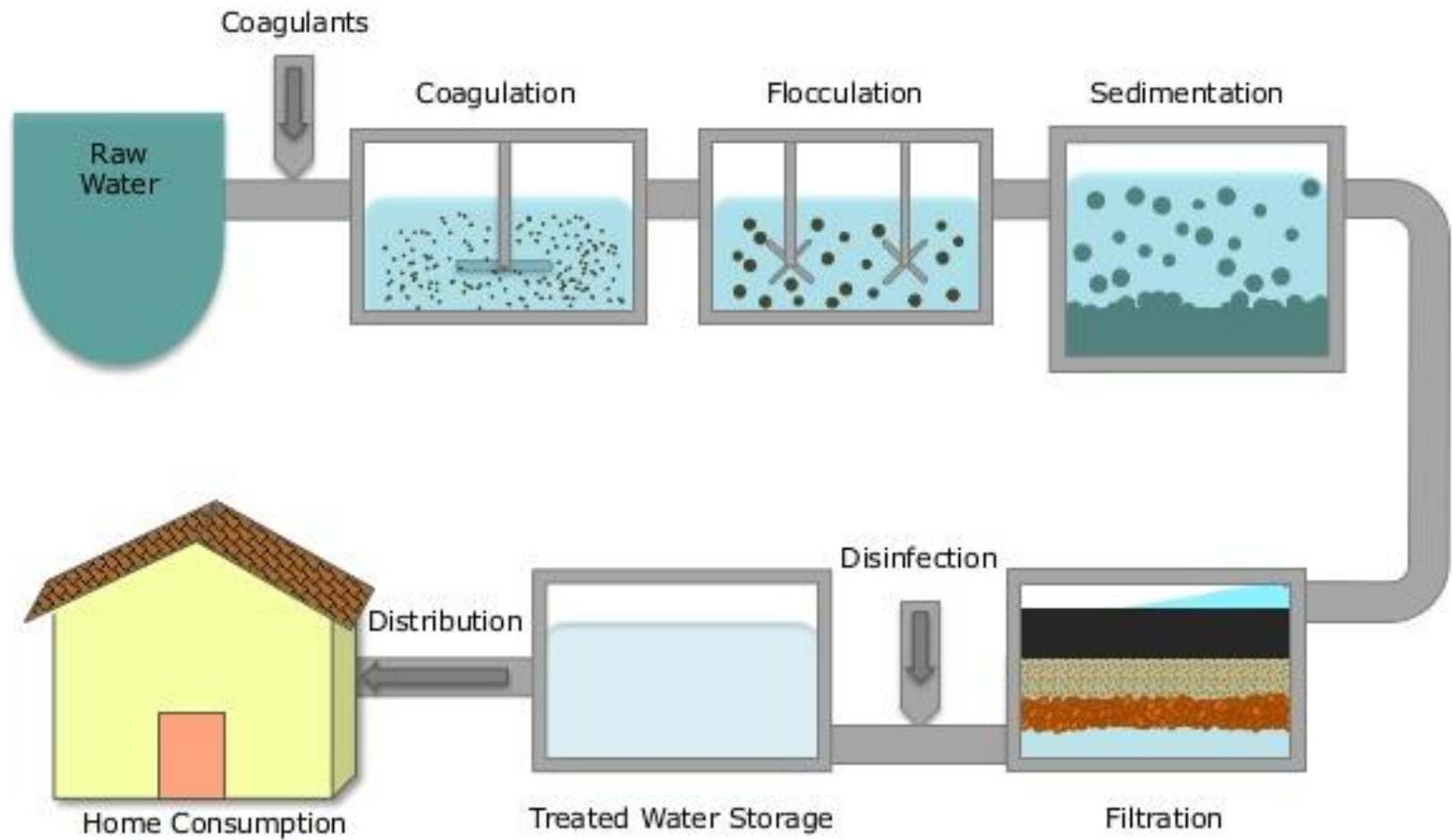


Data sources: Up to 2015 OurWorldInData series based on UN and HYDE. Projections for 2015 to 2100: UN Population Division (2015) – Medium Variant. The data visualization is taken from OurWorldinData.org. There you find the raw data and more visualizations on this topic.

Waste → Energy ✓

Waste → Clean Water ?

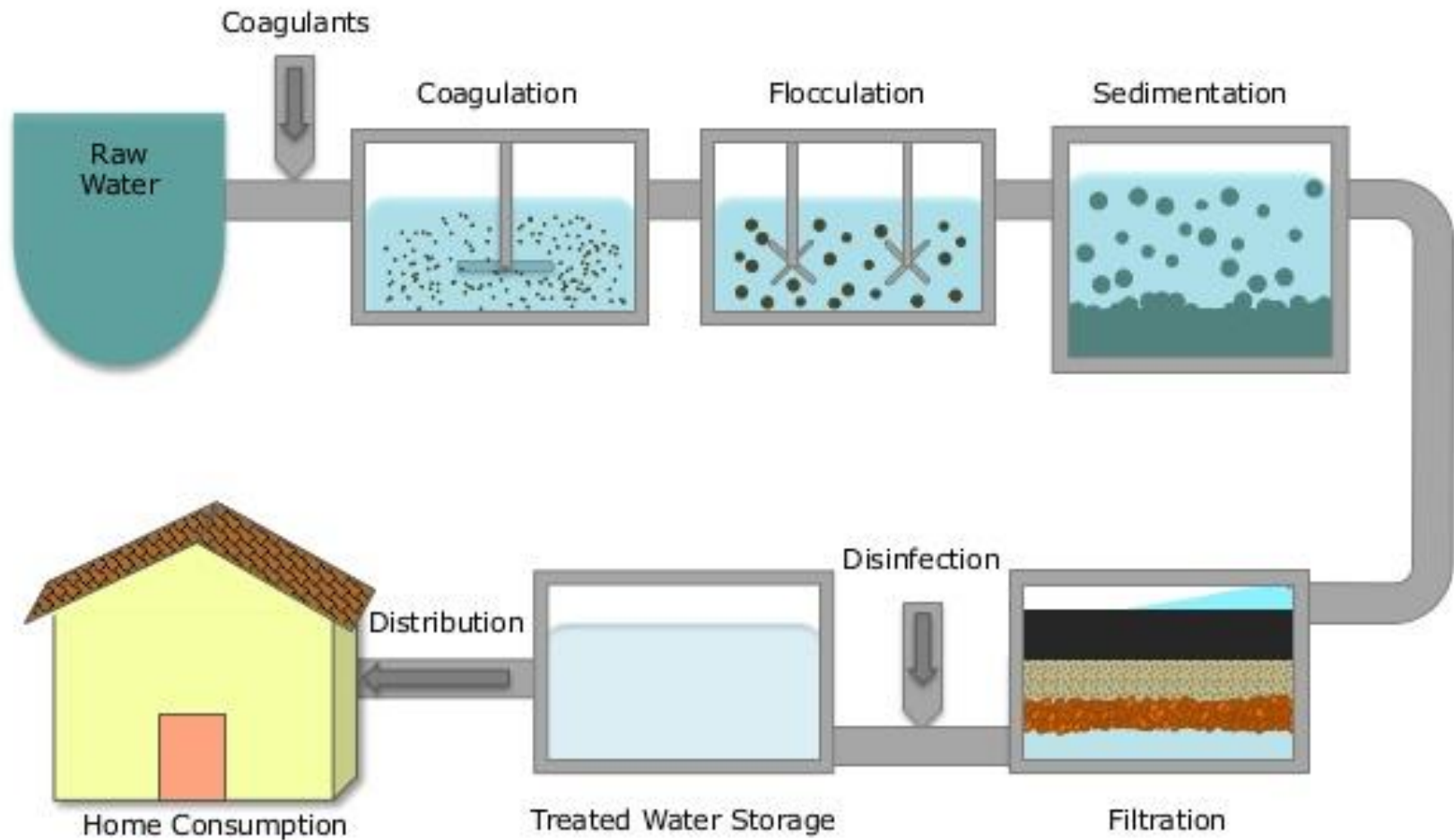
Water Treatment Process



Generation of black liquor and lignin extraction



Water Treatment Process



Assumptions

- Only the Brazilian company Suzano Pulp and Paper is capable of producing 20,000 tonnes of lignin per year;
- With such amount of lignin, they'd able to produce flocculants to treat over 10,000,000 m³ of water.

Assumptions

- With an average of 60m^3 /person per year this amount could supply water for around 165 thousand people.

Thank you!