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# Water: Pricing the Priceless

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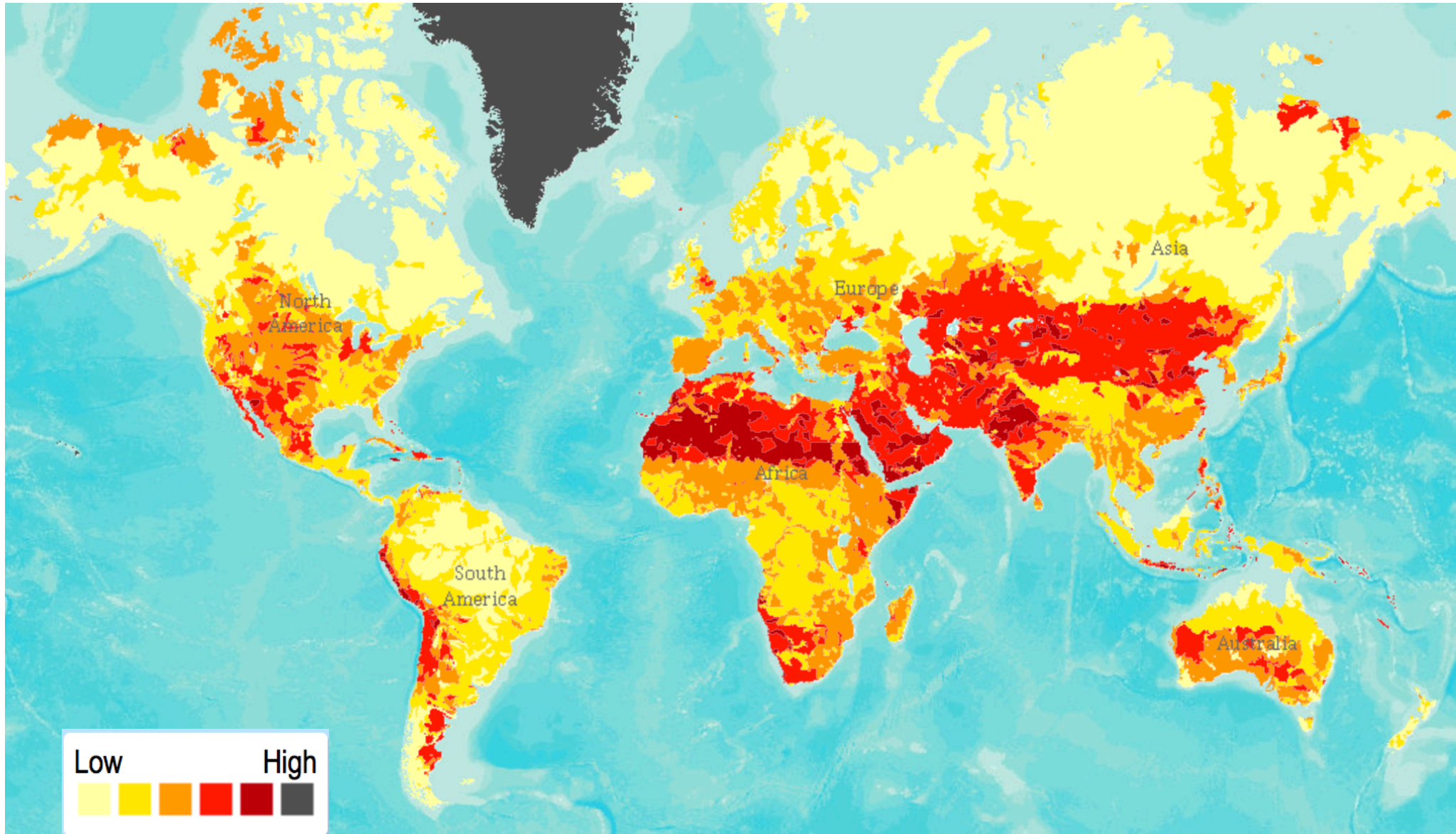
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May 19, 2016

# Agenda

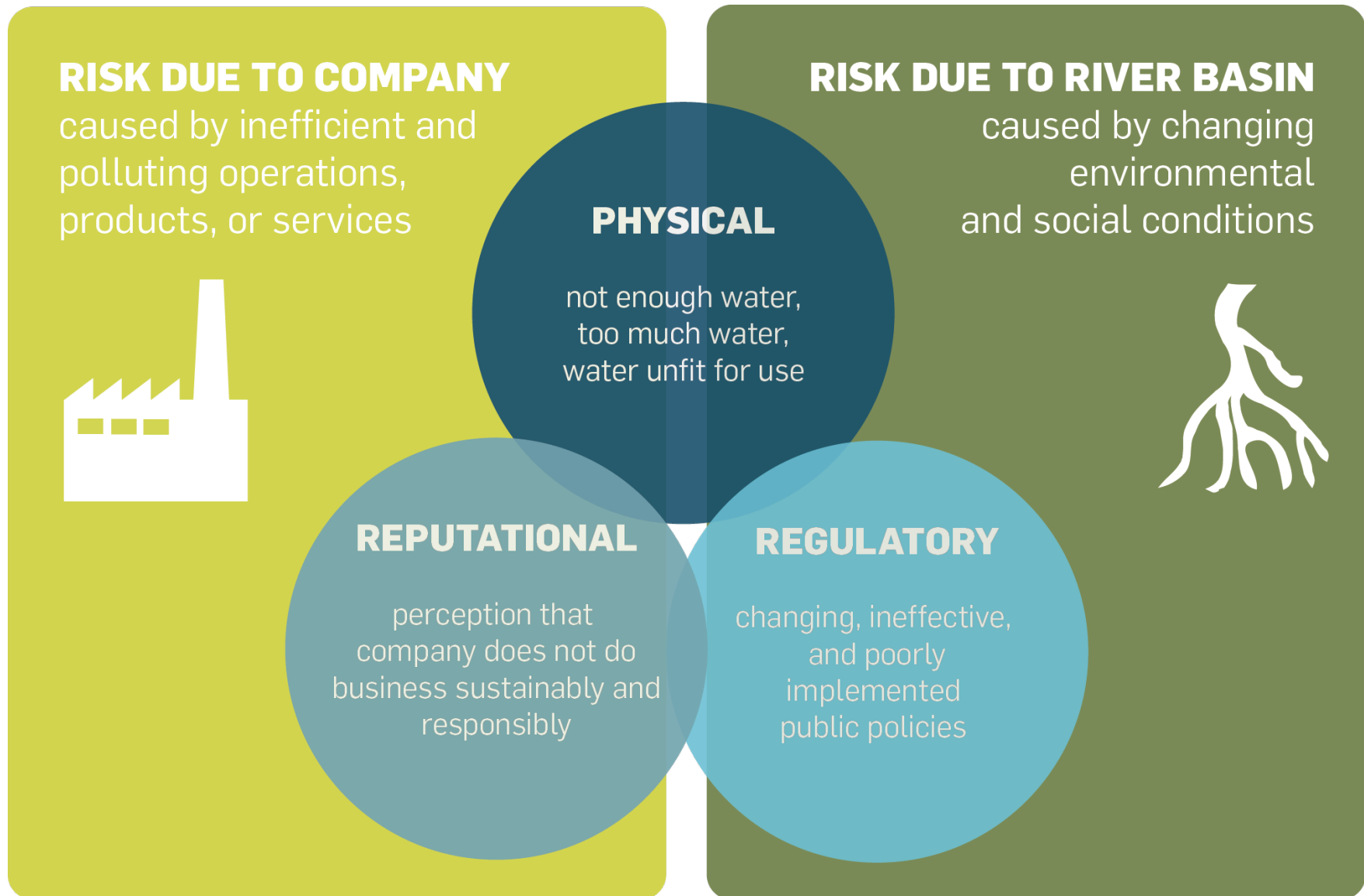
1. Introduction
2. Literature Review
3. Current Industry Practices
4. Interviews
5. Results
6. Recommendations
7. Conclusions

# Introduction



Source: Retrieved from “*Aqueduct Water Risk Atlas*”, by WRI

# Literature Review – Water Risks



Source: Retrieved from “*Motivations for water stewardship strategy*”, by UN Global Compact

# Current Industry Practices

## Organizations



The CEO Water Mandate

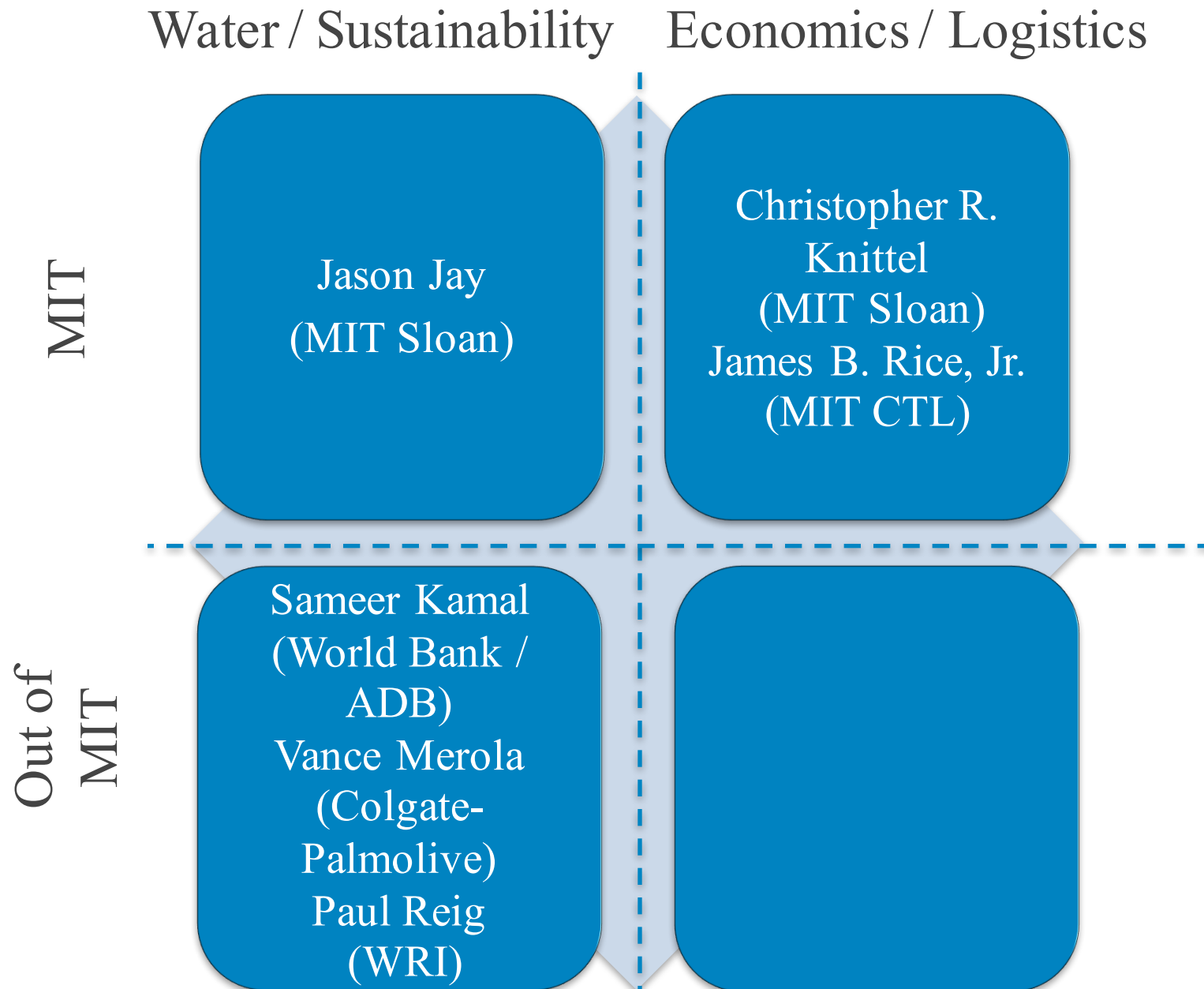
## Tools



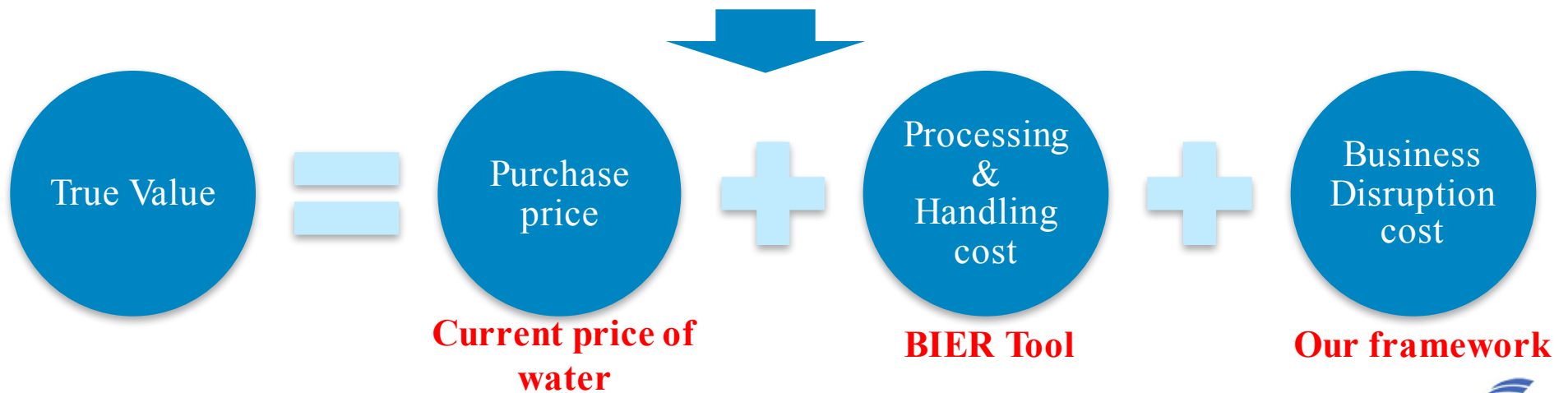
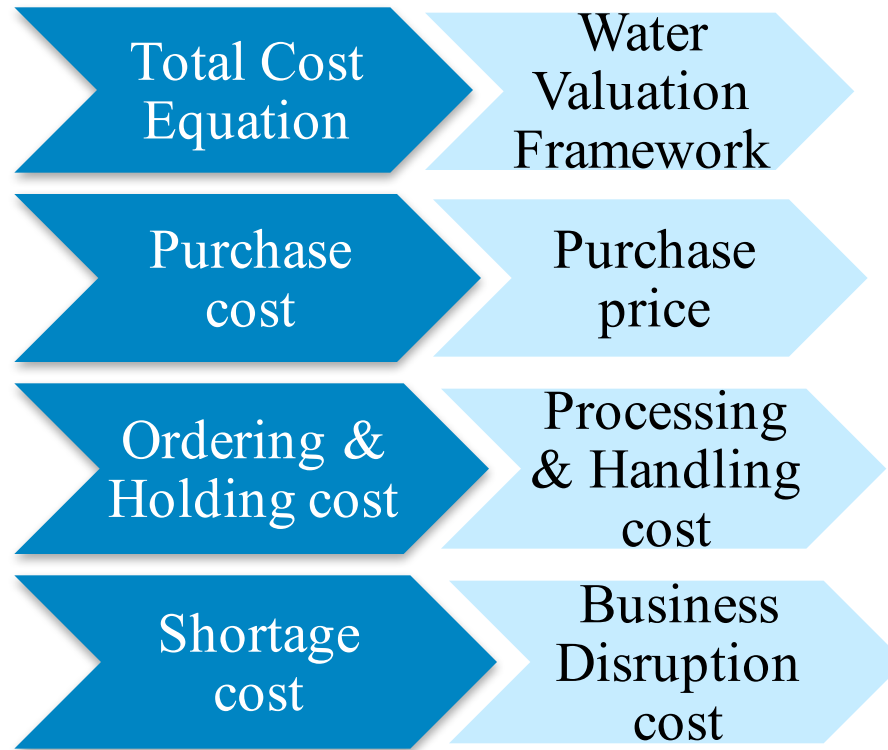
GEMI® Local Water Tool™



# Interviews



# Results – Water Valuation Framework



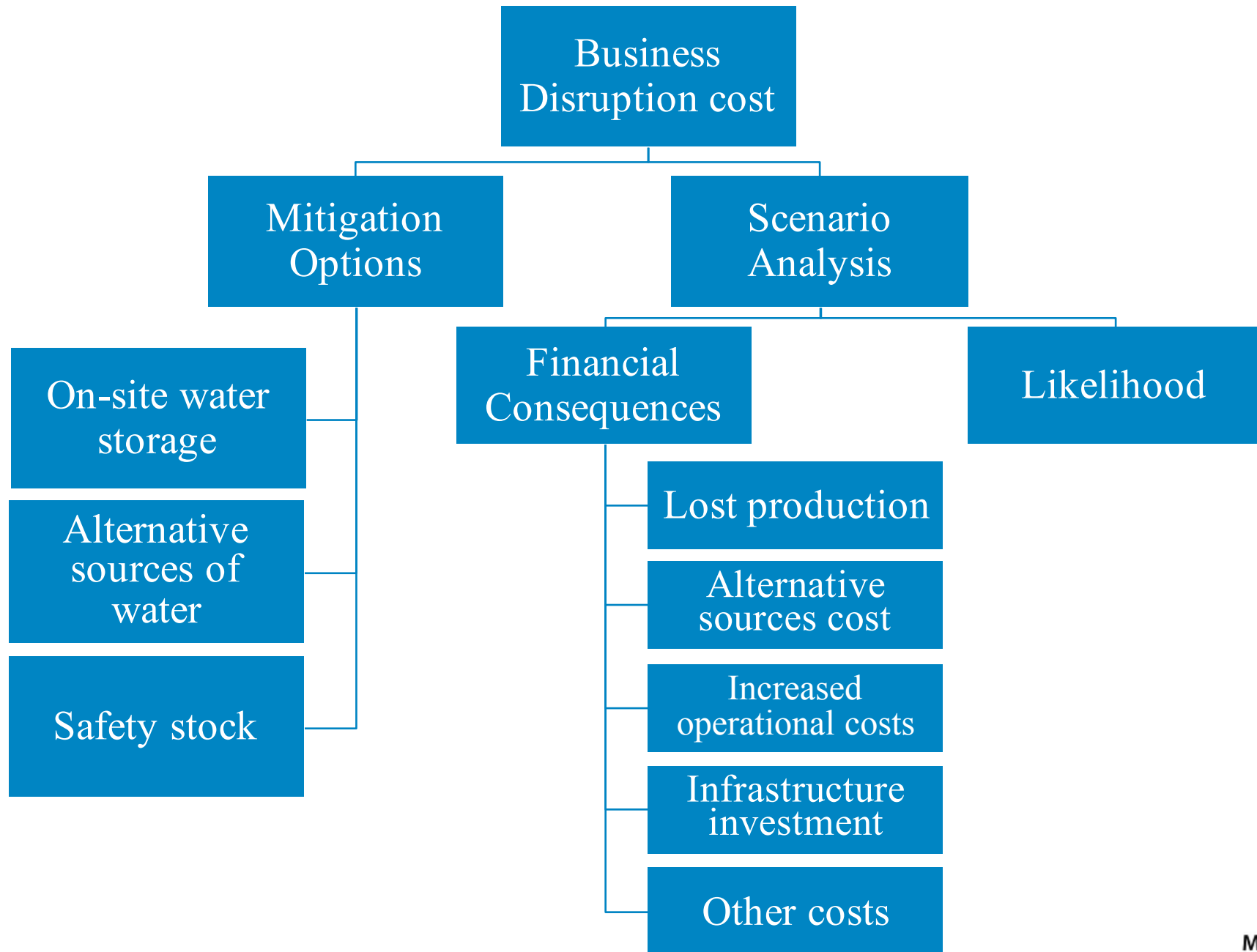
# Results – Business Disruption cost

$$\text{Risk Cost} = \text{Probability (event)} \times \text{Impact (costs due to event)}$$

Use of **decision tree** (**scenario analysis**) to determine risk of all potential scenarios



# Results – Business Disruption cost



# Results – Case tests

Inputs	Case 1	Case 2	Case 3	Case 4
Number of Mitigation Options	1	0	1	2
Lead Category	Laundry	Laundry	Beverages	Hair
Production Level (tons/year)	500K	60K	150K	300K
Total Revenue (€/year)	650M	82M	450M	1000M
Total Water Abstraction (m3/year)	476K	127K	300K	600K
Aqueduct Parameters				
Baseline Water Stress	4	5	0	0
True Value				
Purchase price (€/m3)	€ 2.1	€ -	€ 0.1	€ 0.6
Process & Handling costs (€/m3)	€ 0.6	€ 0.6	€ 0.6	€ 0.6
Business Disruption cost (€/m3)	€ 0.7	€ 8.1	€ 1.9	€ 1.5
True Value (€/m3)	€ 3.4	€ 8.6	€ 2.6	€ 2.6

- Note: Inputs are hypothetical

# Results – Framework Limitations

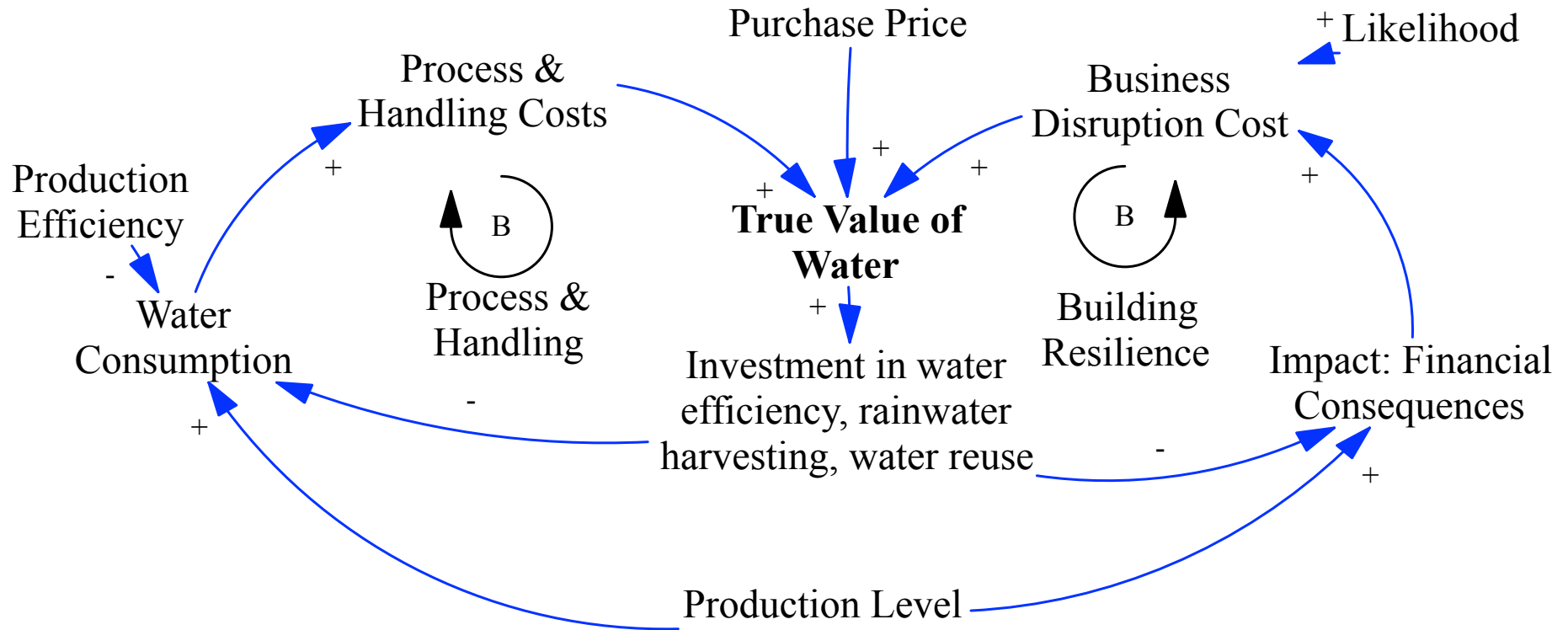
- Limitations
  - Political instability
  - Country's dependence on hydropower
  - Climate change
  - Population growth
  - Ecosystem effects
  - Market share loss
  - Loss of Unilever's reputation
- Factors can be built-in at a later date with further exploration
- Sensitivity cases can explore the change in water valuation associated with alternative scenarios
  - UNFCCC climate change scenarios and population growth

# Recommendations

- Water criticality correlation to volume of production
- Multiple alternative sources of water
- Implications of switching water sources: time delay and fixed costs
- Additional mitigation options and scenarios
- Extensive data collection to enhance accuracy
- Pre-set water shortage event frequencies based on different Aqueduct water stress scores

# Recommendations

- Monte-Carlo simulations for more accurate Business Disruption cost estimation
- Interplay between the Processing and Handling cost and the Business Disruption cost



# Conclusions

- Main objective: Create a water valuation framework useful at any manufacturing site worldwide
- Water risks are location-specific and need to be translated into a monetary value to reflect the **Business Disruption cost**
- **Business Disruption cost** depends on available mitigation options.

# Conclusions

- Main contribution is a methodology to calculate the **Business Disruption** cost
  - Due to lack of historical data, model relies on operational experience
  - Better data collection will enable more accurate results
- Results are preliminary, but first step towards developing a robust water valuation tool
- Continue expanding model's functionality, limitations & accuracy using recommendations

# End of Slides