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LAUNDRY TRANSFORMATION INITIATIVE

Indonesia Study Case

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Indonesia Study Case

2026

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INTRODUCTION

Research Question:
How do manual laundry practices affect water sources and the environment in the Indonesian case study?

SRQ1
What factors drive the community to practice manual laundry?

SRQ2
How does manual laundry contribute to river pollution?

SRQ3
What is the current state of river water quality in the Welang River?

SRQ4
How does pressure from laundry activity affect environmental conditions and related health outcomes?

SRQ5
What responses can be used to improve manual laundry practices?

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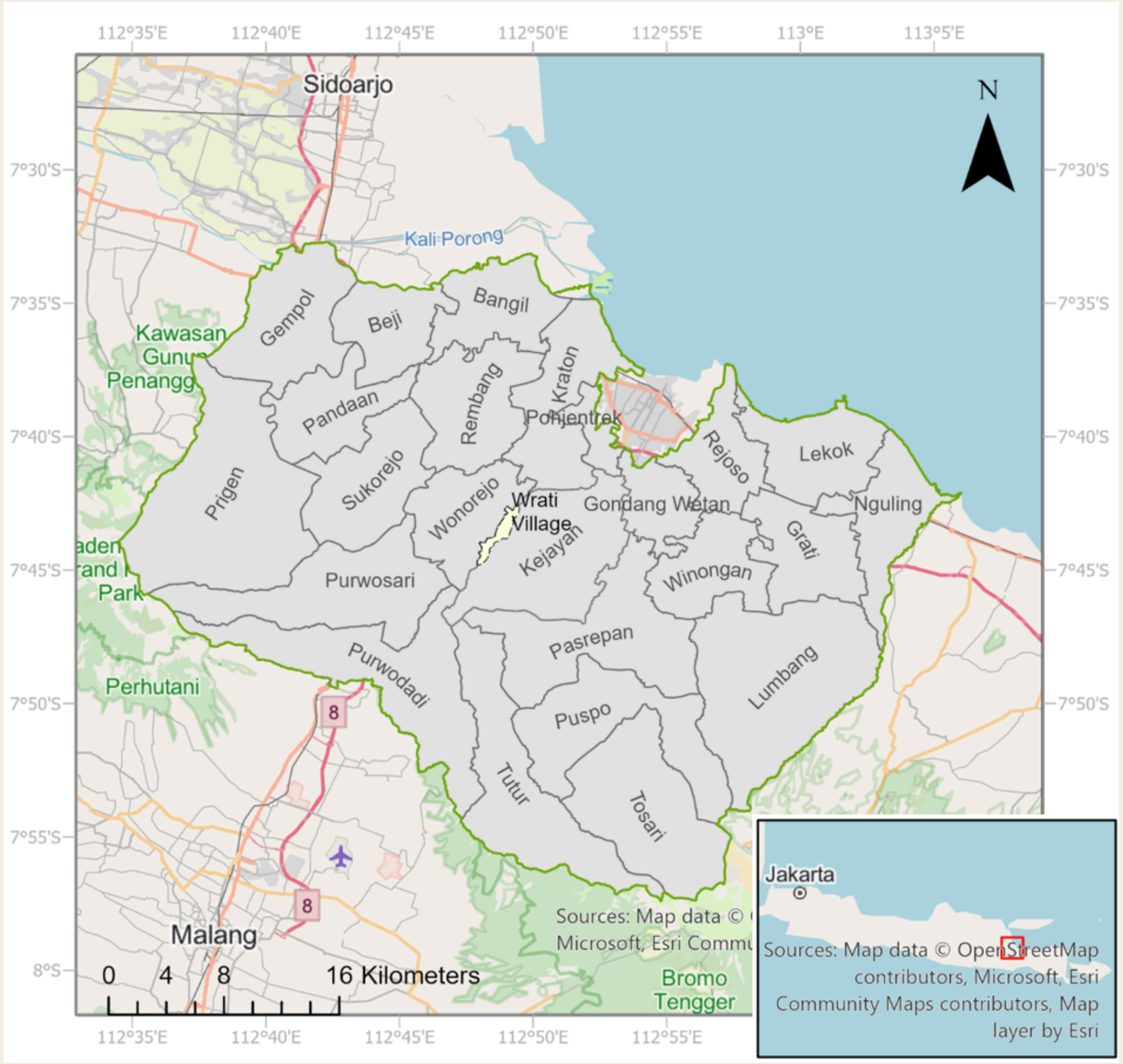
STUDY AREA

Data collection was held in Wrati Village (Neighbourhoods 03, 04, 06, 07, 09 and 10), Kejayan Sub-district, Pasuruan Region, East Java



Legend

- Study Area: Wrati Village
- Pasuruan Sub-regency
- Village Administrative Boundary
- Regency/City Administrative Boundary
- Sub-regency Administrative Boundary

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METHODOLOGY

Household Survey

- Total respondents: 31
- Topic: Environmental conditions, laundry process, laundry service, and general information.
- Data analysis: descriptive statistics

Focus Group Discussion

- Total participants: 35 women
- Topic: environmental conditions, laundry process, and laundry service.
- Data analysis: thematic analysis

Key Informants Interview

- Total participants: 3 out of 5
- Topic: seasonality and water quality, water availability and access, climate change, and implications for laundry solutions.
- Data analysis: thematic analysis

Literature Review & Secondary data collection

- Topic: Impact of domestic laundry and responses to improve this activity.
- Data analysis: narrative synthesis

Secondary data collection: water quality

Field Observation

- Topic: Washing locations, discharge points, water source locations, conditions of settlements along river embankments
- Data analysis: descriptive

Documentation of Data Collection

Focus Group Discussion

Households Survey

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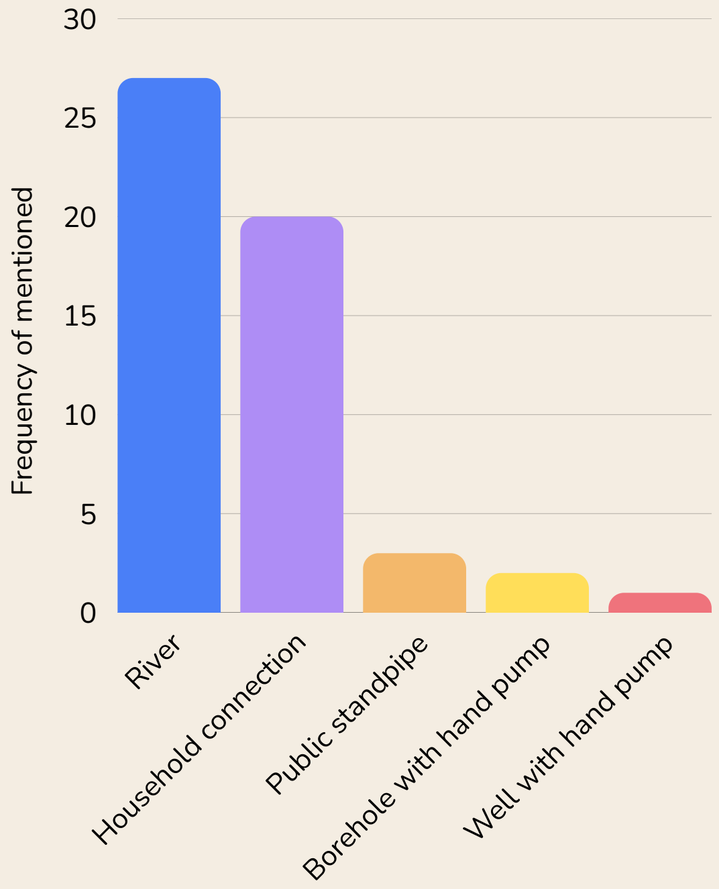
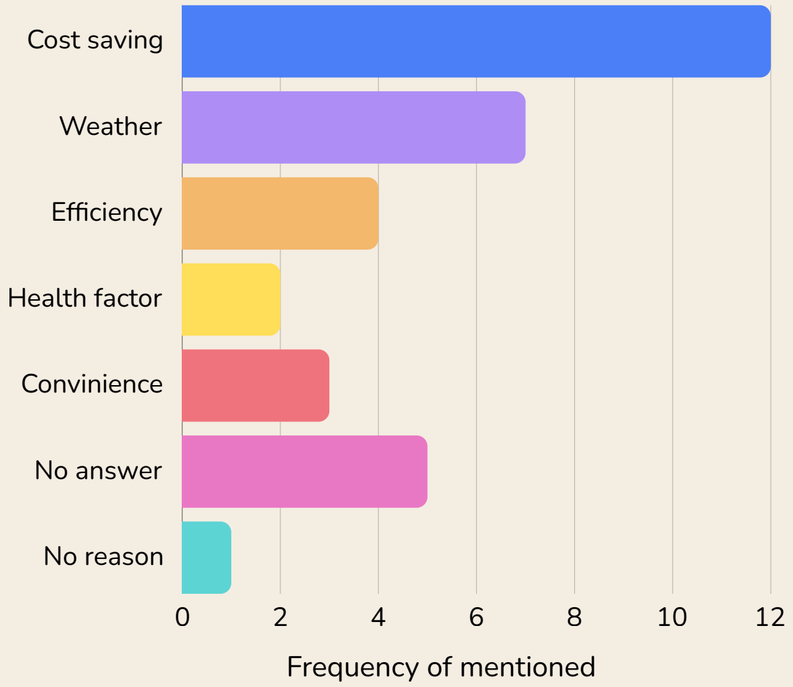
RESULTS

SRQ1- DRIVER OF MANUAL LAUNDRY

Laundry water source



Reason for using multiple water sources



Other reasons (FGD):

- The existing water supply (HH connection) is intermittent
- Social interaction with others

Socioeconomic background:

- Most respondents work as farm labourers.
- Most respondents earn <2,000,000 IDR/month (equivalent to 100 EUR).

Interesting Findings: Clothing with higher value (e.g., school uniform, women's prayer dress) is washed only at home!

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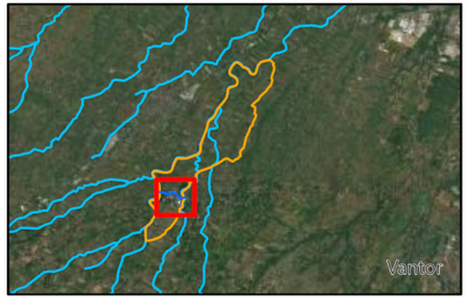
Location of Manual Laundry Practices in Study Area

Legend

- Study Area: Wrati Village
- Households survey area
- Welang River
- Irrigation Channel
- Laundry locations



RESULTS

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Laundry Location in water sources

River

Iririgation Channel

Red colour indicates the thing they use as a scrub board

Laundry at home

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RESULTS

SRQ2-PRESSURE FROM LAUNDRY ACTIVITY

Frequency, duration, and steps

- Frequency: 20/31 respondents do laundry every day
- Duration: 30 minutes to 1 hour
- Steps: Sorting, soaking, cleaning, rinsing, and drying

Water Consumption

- Median of water use per household: 47 L/laundry time or 14 L/person/laundry time

Detergent Consumption

- Type: Liquid and powdered soap in a single-use sachet.
- Brand: 16 brands
- Surfactant content: 4% to 20%
- Phosphate content: information is not available
- Soap ingredients: antibacterial agents, perfumes, capsule perfumes, and softening agents

*Wastewater generation and disposal**

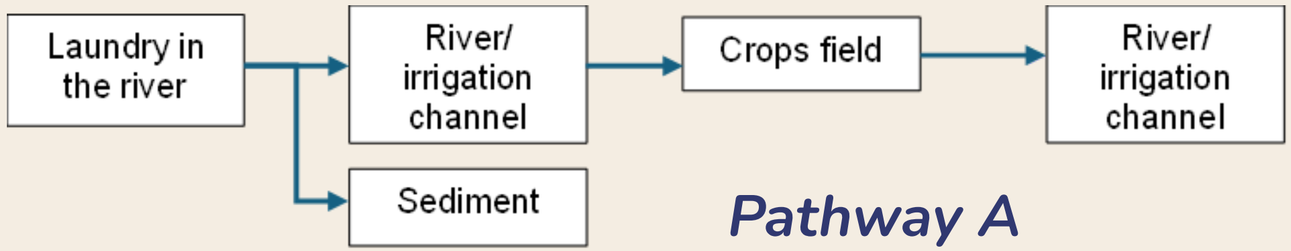
- Wastewater volume: 8.03 m^3/day
- Total surfactant load: ± 1.22 kg/day
- Total PPL - BOD: 14.34 kg/day
- Total PPL - COD: 19.72 kg/day
- Total PPL - TSS: 13.62 kg/day

**The calculation was based on the total number of households in the study area (±239).*

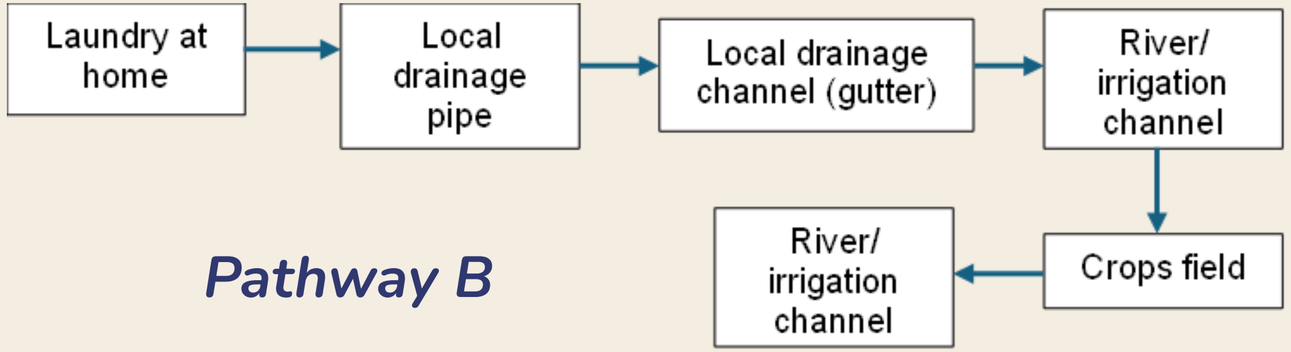
Detergent type: Liquid soap (above) and powder soap (below)

Access to a water source and laundry process

Wastewater disposal



Pathway A



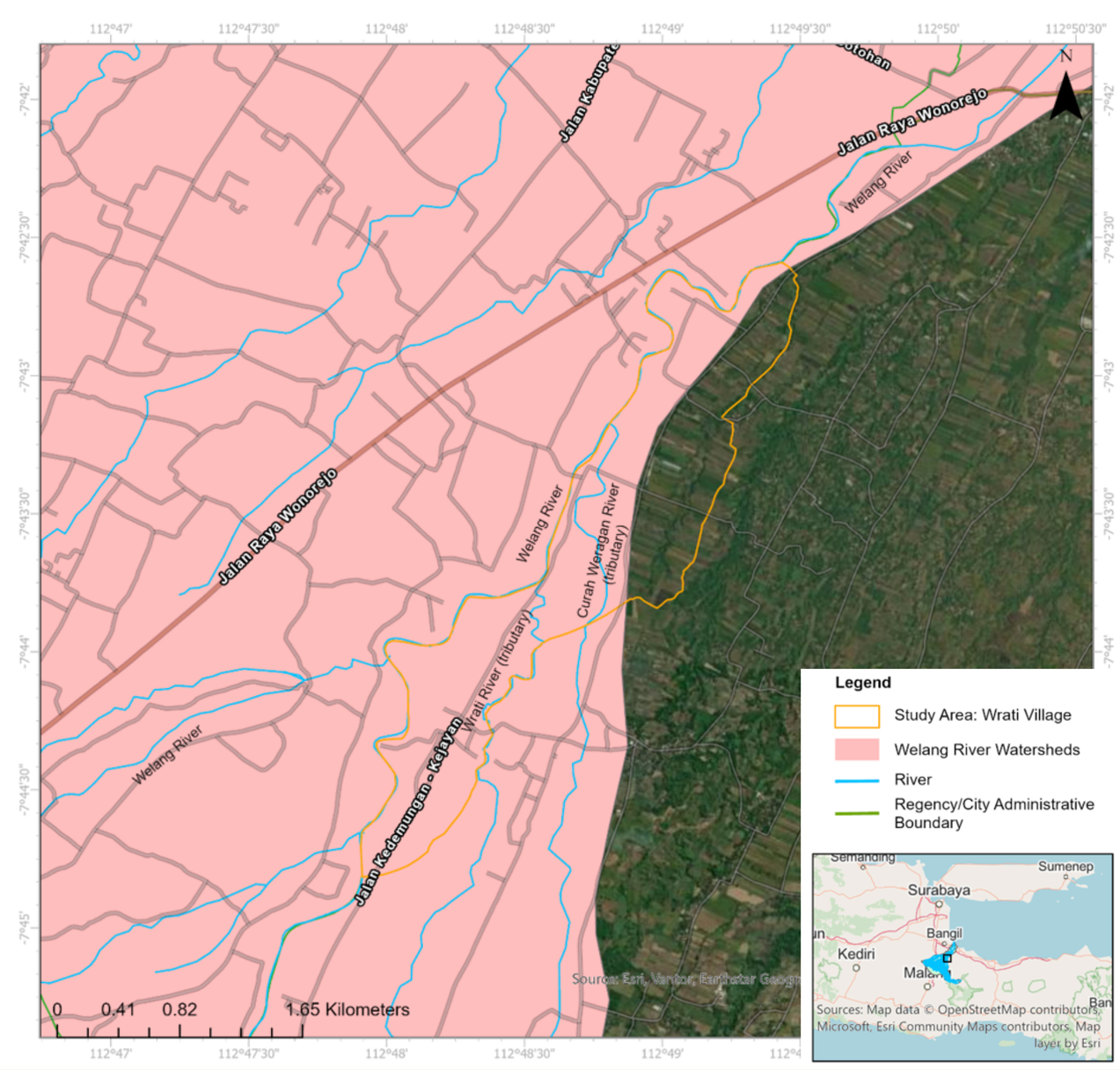
Pathway B

Drainage system

Note: In the study area, there is no domestic wastewater treatment available

RESULTS

SRQ3- STATE OF WATER QUALITY



Upstream (before the study area): BOD, COD, and ammonia parameters exceeded the water quality standard. Other parameters such as TDS, pH, DO, lead, and total coliform still complied with the WQS.

Downstream (after the study area): DO concentration decreased and did not comply with the WQS.

The impact of laundry activity could not be quantified because the existing water quality data were far from the study area

Source: Nita et al., 2025; Ramadhani et al., 2025

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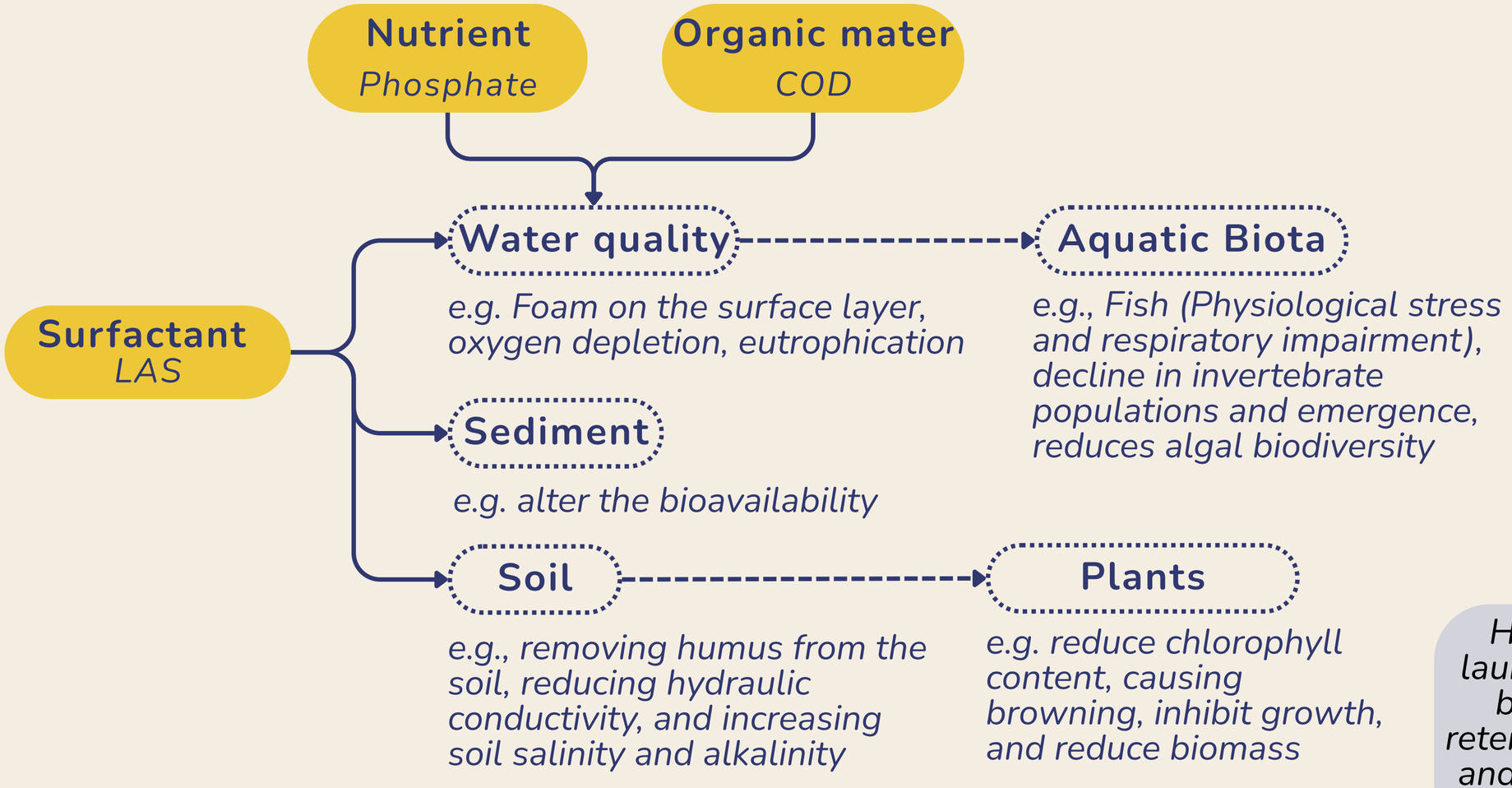
RESULTS

SRQ4- LAUNDRY IMPACT ON THE ENVIRONMENT



However, few research shows laundry greywater can boost crop biomass, leaf area, and water retention due to beneficial nutrients and nonionic surfactants acting as soil wetting agents.

Source: Ratnaningsih et al., 2019; Hardie et al., 2021; Mousavi & Khodadoost, 2019; Belanger et al., 2002; Rejeki et al., 2008

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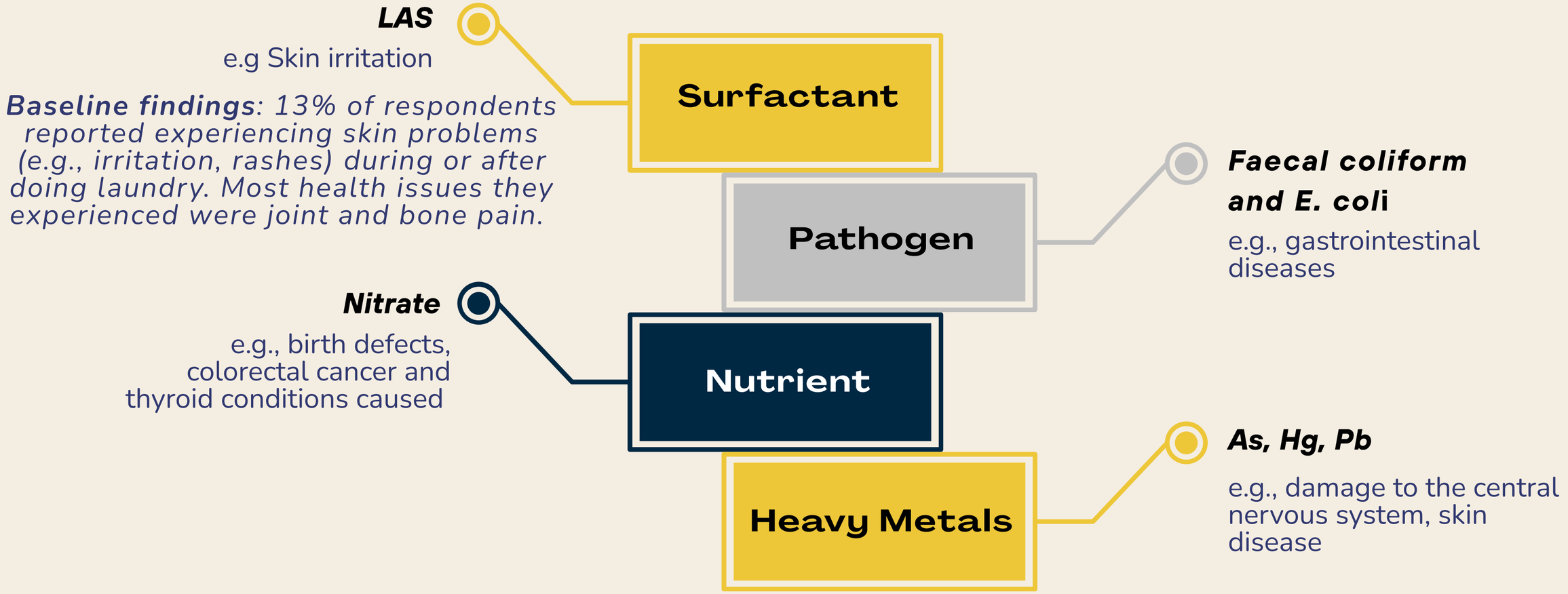
HEALTH IMPACT

The impact might happen if there is skin contact and oral consumption



Source: Lin et al., 2022; Wulandari et al., 2024; Landeck et al., 2020

RESULTS

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SRQ5-RESPONSES

Roof Rainwater Harvesting

- Aim: Addressing intermittent water supply and reducing dependence on the river.
- Benefits: Reduced water bills and a reliable water supply.
- Challenges: storage capacity, initial investment cost, disruption to existing water system

Constructed wetland

- Aim: To reduce the environmental risk of wastewater discharge with high COD, TSS, surfactants, and phosphate.
- Benefits: no electrical energy required, low operating cost, use of local materials.
- Challenges: large land use and climate-sensitive

An alternative soap that is more environmentally friendly

- e.g., coconut leaf waste, Quillaja, starfruit, Sapindus rarak DC.
- Aim: reduce the environmental risk of conventional detergent consumption.
- Benefits: reduction of pollutants entering the environment (lower toxicity, biodegradability)
- Challenges: availability, higher prices, and community perception

Slow Sand Filtration

- Aim: To reduce the environmental risk of wastewater discharge with high COD, TSS, surfactants, and phosphate.
- Benefits: Easy to operate, simple, and low-cost.
- Challenges: Scaling up may be difficult

RESULTS

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SRQ5-RESPONSES

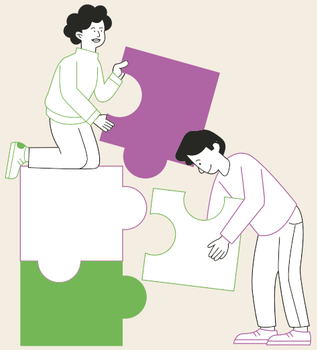
Education about hygiene practices

- Examples: Community-based educational campaigns using town hall meetings, peer educators, and visual aids to disseminate the messages.
- Benefits: ownership, behavioural shifts, fostering social accountability and collective action.

Restructuring the built environment

- Example: Provide a communal laundry station.
- Benefits: Continued exposure to the technology, communities are able to experience the changes and perceive the benefits in a short period.

Behavioural Intervention



Training

- Examples: Capacity-building program targeting local stakeholders. Training includes theoretical knowledge and practical skills.
- Benefits: The community may take proactive roles in maintaining technical interventions.

WHAT DO THE FINDINGS MEAN?

1. The existing water supply infrastructure does not meet one crucial aspect: continuity.
2. The economy plays a significant role in their practices.
3. The community has some knowledge, but they suppress this awareness during routine activities to protect their psychological comfort.

D

1. Laundry is an everyday practice that uses water and detergent. There is an indication that the purpose of doing laundry is not fully achieved with the current water quality and detergent use.
2. Release of pollutants into the environment without treatment reduces the river's self-purification capacity.
3. Potential accumulation of LAS in agricultural production

P

1. Welang River water quality indicated a deterioration. However, other anthropogenic activities and land use also influence it.
2. Components in laundry soap, e.g., surfactants, organic matter, and nutrients, can change water characteristics

S

1. Negative impacts on water quality also affect aquatic life, soil, and plants at high pollutant concentrations.
2. Long-term, large-scale exposure can lead to additional health problems.

I

1. Tailored technical and social interventions are needed to improve laundry practices (short-, medium-, and long-term plans).
2. There is a need for a financial scheme to ensure the long-term viability of the intervention.

R

Limitation

1. Data collection: FGD setting, language barriers, question formulation and types, and a limited number of KIIs.
2. Secondary and primary data on raw water quality and wastewater effluent are limited, so the impact analysis relied on a qualitative approach.

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RECOMMENDATION

Further research

- Conduct water quality assessments for water sources, wastewater and receiving water bodies.
- Research instruments should be adjusted to minimise retrospective recall burden, ensuring construct validity across all variables.
- Expand the research scope (e.g., financial scheme testing, infrastructure model, and policy framework)

Project

- Expand the intervention into laundry wastewater management.
- Test local materials as an alternative bio-detergent; this can be one of the future business models that help women and also reduce the environmental impact.
- Development of an integrative module for the utilisation of tools for long-term use.
- Raising awareness among the community about the impact of unhygienic practices using different campaign tools.

CONCLUSION

Local laundry practices are driven by limited infrastructure and socio-economic conditions. While seemingly simple, these practices significantly affect the environment and public health. This requires systemic transformation not only in the laundry process itself, but also in wastewater management. The solution must be context-specific and gradual, combining technology, education, and financial schemes to support long-term changes.

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THANK YOU

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