# Swimming Lessons Through a Systems Approach: Preventing Child Drowning in Indonesia's Resource-Limited Settings

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## 1 INTRODUCTION

- Drowning is a leading yet preventable cause of child mortality in Indonesia.
- Swimming lessons protect children but remain inaccessible in resource-limited provinces such as NTB, constrained by socioeconomic, facility, and geographic barriers.
- In an LMIC nation such as Indonesia, a systems-thinking approach is essential to better capture these interdependencies and design sustainable, scalable solutions.

### OBJECTIVE

To apply a **systems-thinking approach** using **causal loop diagrams (CLDs)** to explore factors shaping access to swimming lessons in NTB and Indonesia, and to identify leverage points for sustainable drowning prevention.

## 2 METHODS

- Design: Mixed-methods study with qualitative emphasis.
- Data Sources:
  - Scoping review of peer-reviewed and grey literature.
  - Review of policy and government documents.
  - Qualitative focus group discussions (FGDs) with parents, community leaders, and PE teachers.
- Analysis: Thematic coding, iteratively mapped into a causal loop diagram (CLD) to capture system dynamics.

### Qualitative Study Site

- 7 sub-districts of Lombok - NTB, Indonesia (high drowning risk).


### What is a Systems Approach?

- A holistic way to examine how policies, resources, behaviours, and community factors interact.
- Goes beyond isolated interventions → focuses on feedback loops and leverage points for lasting change.
- Helps see the "bigger picture" of complex problems such as drowning prevention.

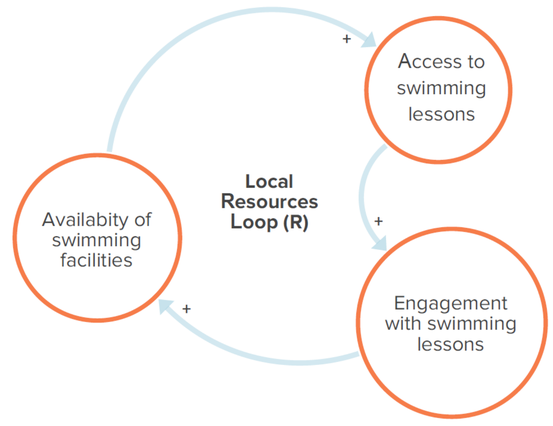
### What are Causal Loop Diagrams (CLDs)?

- One of the core tools in systems thinking.
- Visually maps system feedback and interactions.
- Useful to identify both opportunities and barriers.
- In this study, we applied a systems approach and used CLDs to map interdependencies shaping swimming lesson access in NTB and Indonesia.

## 3 RESULTS

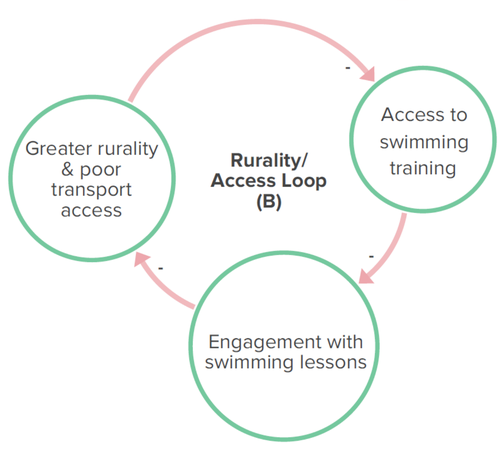
### When Change Builds Momentum (Reinforcing Loops, R)

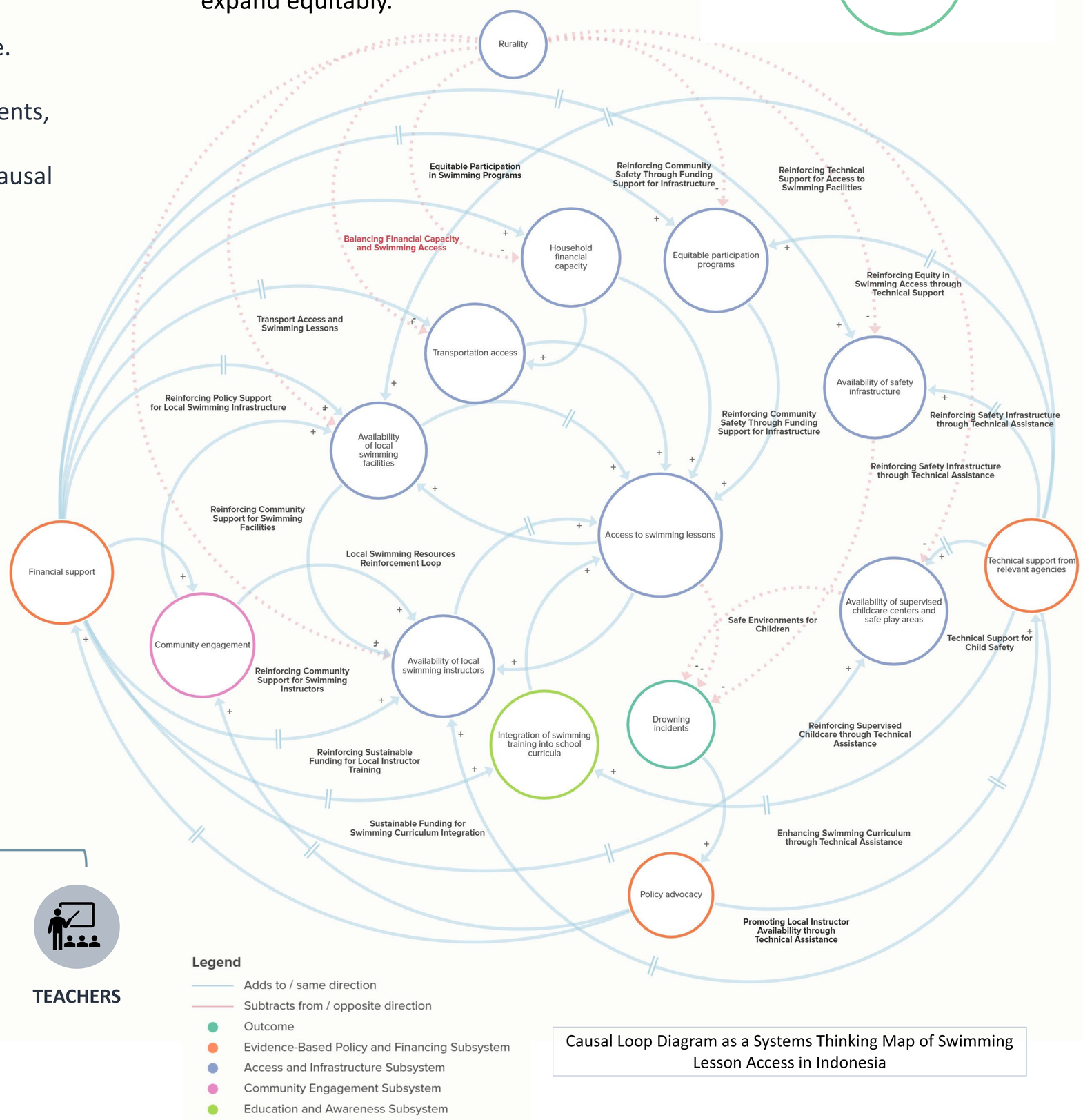
- Amplify changes, creating growth.
  For instance:
  **Reinforcing Local Resources Loop**
  More facilities → more children access swimming lessons → more participation → stronger justification for investment & funding → expansion of local facilities.




### When the System Pushes Back (Balancing Loops, B)

- Counteract change, stabilizing the system.
  For instance:
  **Balancing Rurality & Access Loop**
  Greater rurality & poor transport access → fewer children able to join lessons → participation stagnates → system cannot expand equitably.




Causal Loop Diagram as a Systems Thinking Map of Swimming Lesson Access in Indonesia

## 4 CONCLUSION

- The systems map/CLD highlights reinforcing loops (resources, education, community engagement) that can be leveraged for scaling interventions.
- Balancing loops (financial constraints, rural gaps, fatalistic beliefs) show where targeted policies and subsidies are needed.
- Integration into school curricula and community-led advocacy are key pathways for sustainable and equitable access.
- Findings align with WHO recommendations but underscore the need for local adaptation in island and resource-limited contexts such as NTB.

## REFERENCES

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