



Few Next Step Avenues:

- Scientific: This is a qualitative model – needs to be quantified to assess the strength of the associations.
- Advocacy Groups: Stakeholder networks

Thank you!

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DIET
DISPARITIES
LAB



Participatory Systems Mapping: Underlying Drivers and Lever Points to Reduce SSB and Increase Water Intake in Puerto Rico

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Co-investigators: Dr. Wendy Ellis, Dr. Daniel Chen, Alyssa Luisi from Center for Community Resilience,
George Washington University

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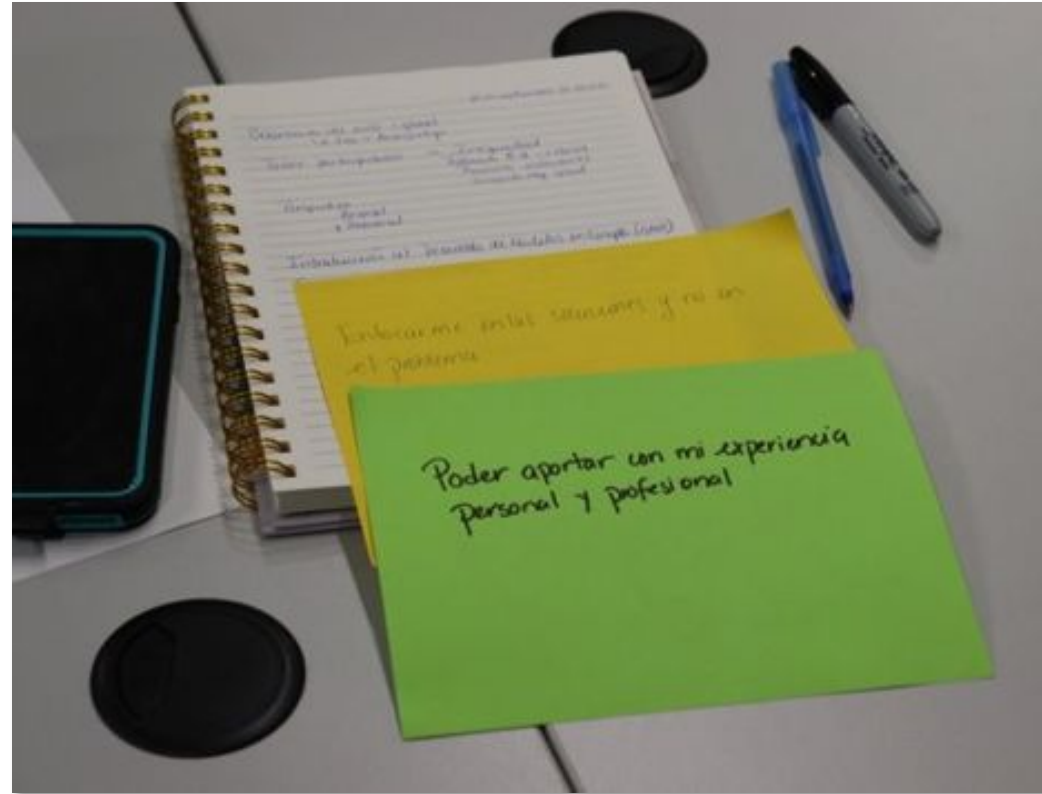


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Objectives

1. Identify the underlying drivers of consumption of:
water
excess juice
sugar-sweetened beverages (SSB)
among families in Puerto Rico (PR)
2. Inform intervention points to curb SSB intake



Rationale: Overconsumption of 100% Fruit Juice among WIC Infants & Toddlers in PR

- Parents consider fruit juice to be healthy
- Infants & toddlers in PR are overconsuming these foods

AAP recommends ***no juice*** in 1st year of life:

- In PR: 26% of infants in first year consume >6 oz of juice/day
(in a sample of WIC participants in PR)

AAP recommends <4 oz juice/day after 1st yr

- In PR: average consumption is 8.4 oz/day in toddlers (ages 12 to 24 months)

Difficulty differentiating between 100% fruit juice and fruit-flavored SSB



Can Water be the Default Drink?

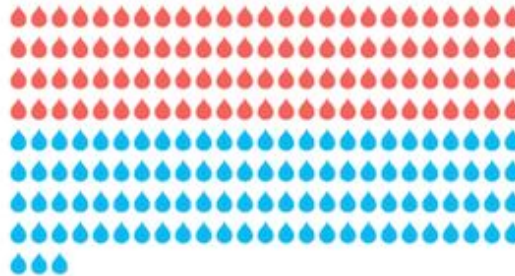


Safe Drinking Water Act violations

99.5%

**OF PEOPLE IN PUERTO RICO
WERE SERVED BY WATER
SYSTEMS WITH DRINKING
WATER VIOLATIONS IN 2015**

**201 OUT OF 406 WATER SYSTEMS
COMMITTED 545 HEALTH-BASED
VIOLATIONS IN 2015 IN PUERTO RICO**



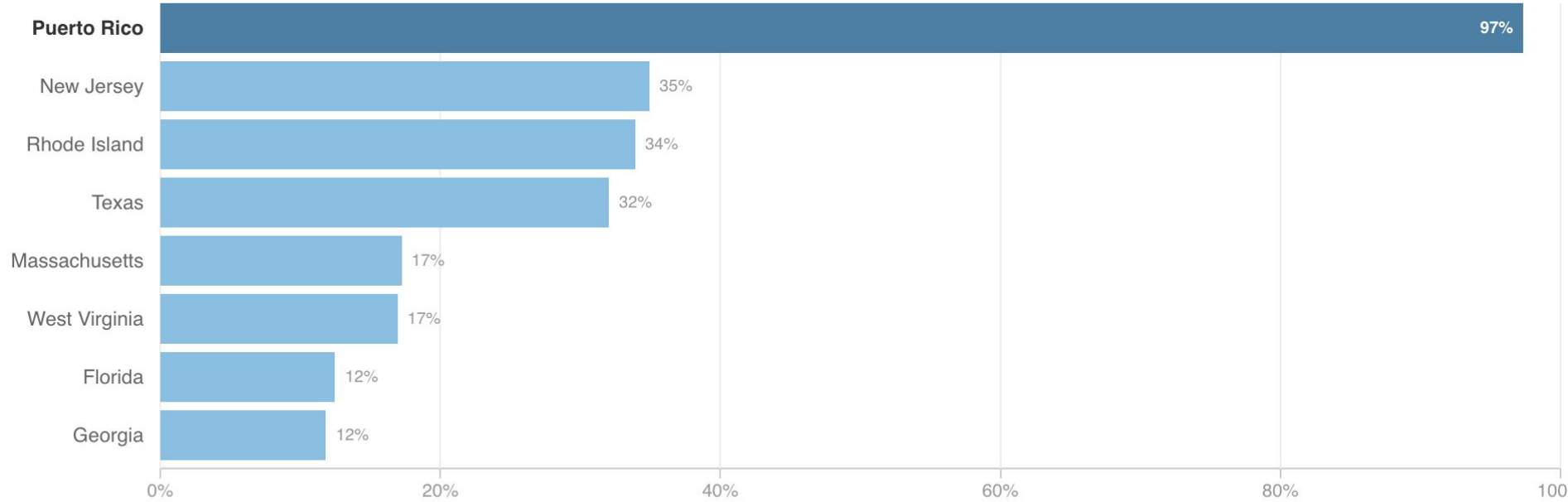
2.4 MILLION

**PEOPLE WERE SERVED BY
WATER SYSTEMS WITH
HEALTH-BASED VIOLATIONS
IN PUERTO RICO IN 2015**

Source: "Threats on Tap: Drinking Water Violations in Puerto Rico." NRDC, 10 May 2017.

Testing Violations Lead Puerto Rico Residents To Distrust Water

Virtually the entire population of Puerto Rico got its water from water systems cited for at least one violation of the lead and copper testing requirements under the Safe Drinking Water Act between January 2015 and March 2018 (the most recent month available). Below, states and territories where more than 10 percent of the population was served by systems cited for testing violations during that time.



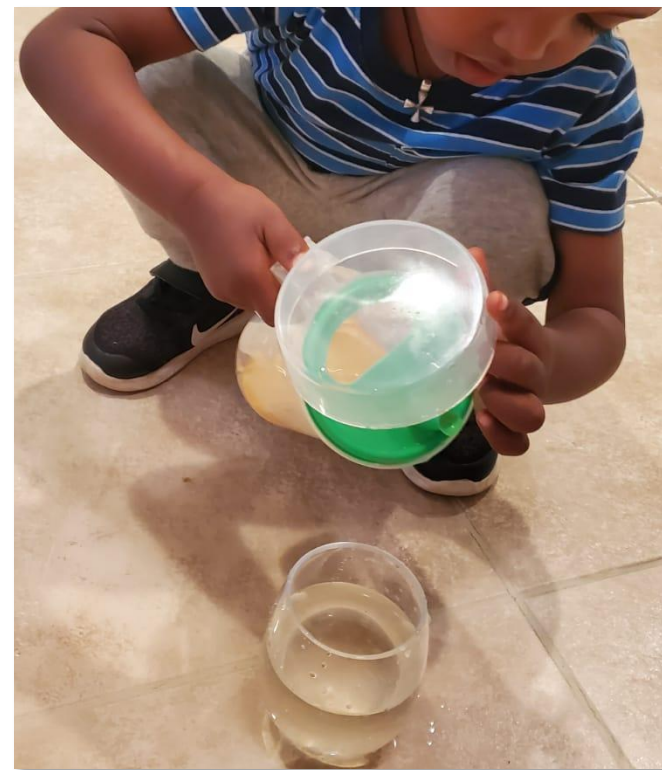
Source: Water utility data from Jan. 2015-March 2018 reported to the Environmental Protection Agency; Census Bureau Population Estimates (2015)

Credit: Rebecca Hersher and Alyson Hurt/NPR

Use of Water Filter led to Decreased SSB Intake

Water Up!@Home RCT

- CBPAR co-designed intervention: Water filter pitcher, Early Head Start developmental milestones in home visiting program: Water Up! Intervention (McCarley 2021)
- Water filter alone mitigated tap water safety concerns (Santillan-Vazquez 2022)
- Led to significant increases in water consumption and decreases SSB consumption (Reese 2022)



1. Reese AC et al. 2022 [Use of a Water Filter at Home Reduces Sugary Drink Consumption in a Predominantly Hispanic Community: Results from the Water Up!@ Home Intervention Trial](#). JAND.
2. McCarley S, López-Ríos M, et al. 2021. [Using a Community-Based Participatory Mixed Methods Research Approach to Develop, Evaluate, and Refine a Nutrition Intervention to Replace Sugary Drinks with Filtered Tap Water among Predominantly Central-American Immigrant Families with Infants and Toddlers: The Water Up @Home Pilot Evaluation Study](#). Nutrients.
3. Santillan Vazquez et al. 2022 [How providing a low-cost water filter pitcher led Latino parents to reduce sugar-sweetened beverages and increase their water intake: explanatory qualitative results from the Water Up!@Home intervention trial](#). PHN.

However, we wanted to understand more sustainable ways to support this behavior.



Methods: Participatory Systems Mapping

- Network of factors, outcomes and elements of a system in causal relationships
- Based on perspectives shared by stakeholders
- Intended to be 'owned' and utilized by stakeholders
- Meant to capture all the complexity important to stakeholders



Two Group Model Building Workshops in PR

Workshop 1: September 2022

(n=12)

Member checking November
2022 (virtual)

Workshop 2: January 2023

(n=23)

Group discussion with parents
(n=5) April 2023
Member checking July 2023
(virtual)

Head Start

Comienzo Saludable

USDA Food&Nutrition

LUMA Energy

PRODEV PR PR WIC

PRoduce PR Food Bank PR
PR Science Trust

UPR FURIA Inc

TAIS Grupo NAVIS

Boys and Girls Club

COHeAl Center

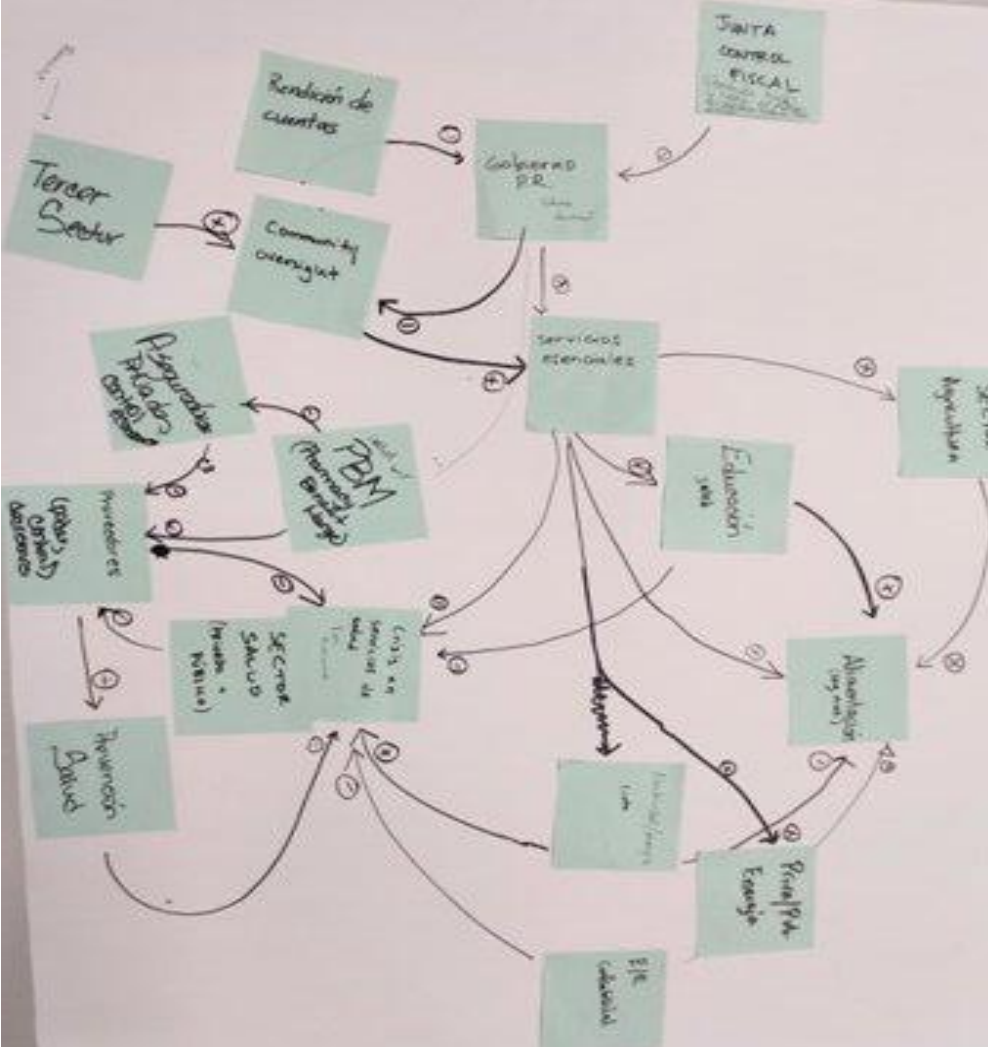
Medical Professionals

Nutriendo PR

Instituto Nueva Escuela

Workshop 1: September 2022 (n=12)

Reference problem: What factors affect rising diabetes rates in PR?



Small groups developed two Causal Loop Diagrams

Workshop 2: January 2023 (n=23)

Reference problem: what factors influence SSB and water consumption among families with young children in Puerto Rico?



Group Discussion with Parents

"What could be done to help families like yours to make decisions about what your children eat and drink?"

... To reduce SSB consumption?"

... To increase consumption of water?"



Early Head Start Parents and our team after group discussion in SJU: April 2023

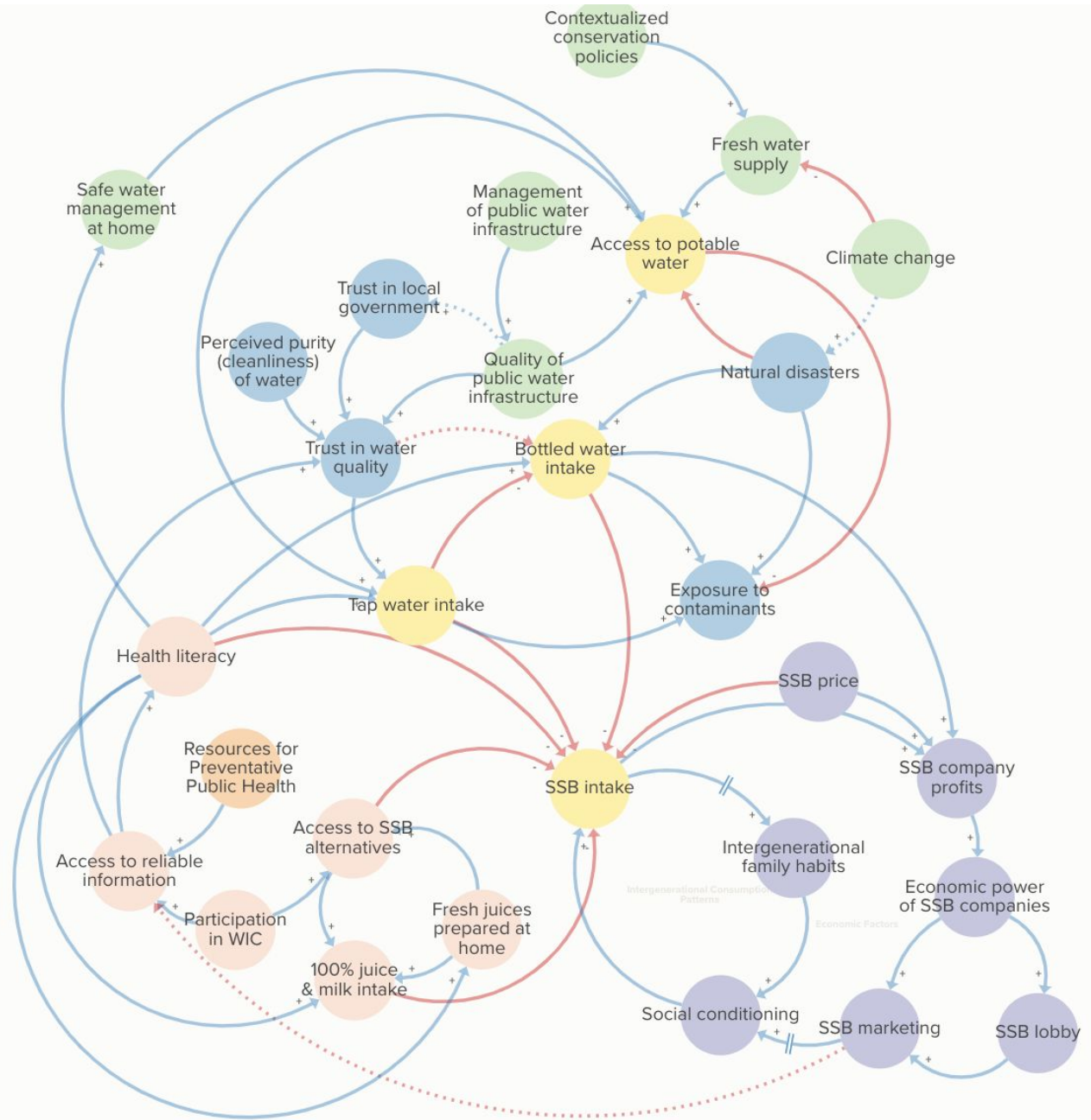
Preliminary causal loop diagram that emerged from the GMB workshop, asking them to check the assumptions that underlie the relationships of cause and effect and network of factors.

Qualitative Data Analyses

- All discussions audio recorded and transcribed verbatim
- Visual data: all artifacts (i.e. key variables, graphs of variables over time).
- Variable Relationship Analyses: The qualitative data were input into MS Excel and uploaded to Kumu.io to create one consolidated system map CLD in Spanish.
- Relationships were checked systematically against workshop notes, artifacts, and transcription.
- Presented to members for member checking

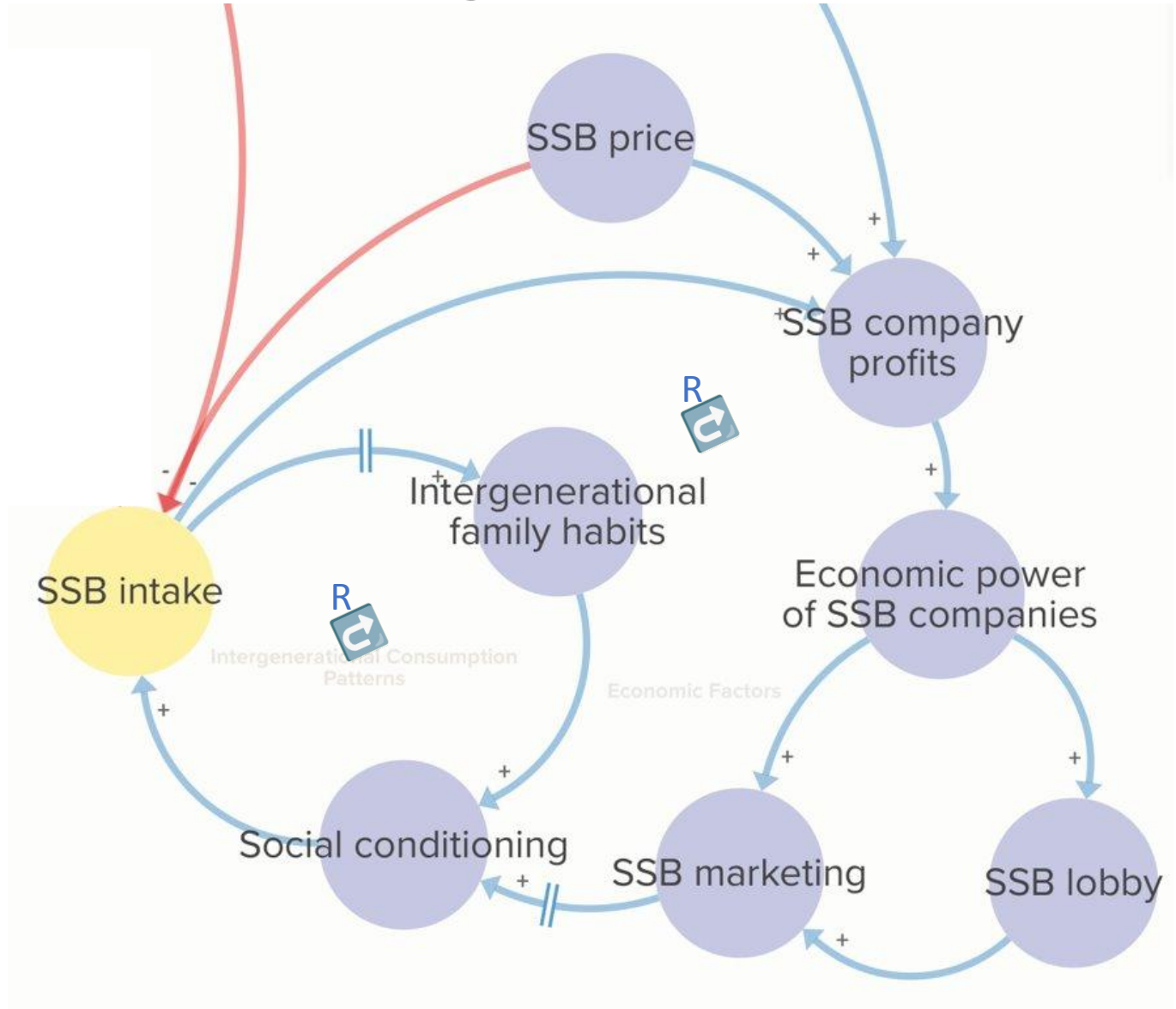


Consolidated Systems Map of Causal Relationships



Key Finding 1: **SSB Marketing** & Intergenerational Habits contribute to Social Conditioning

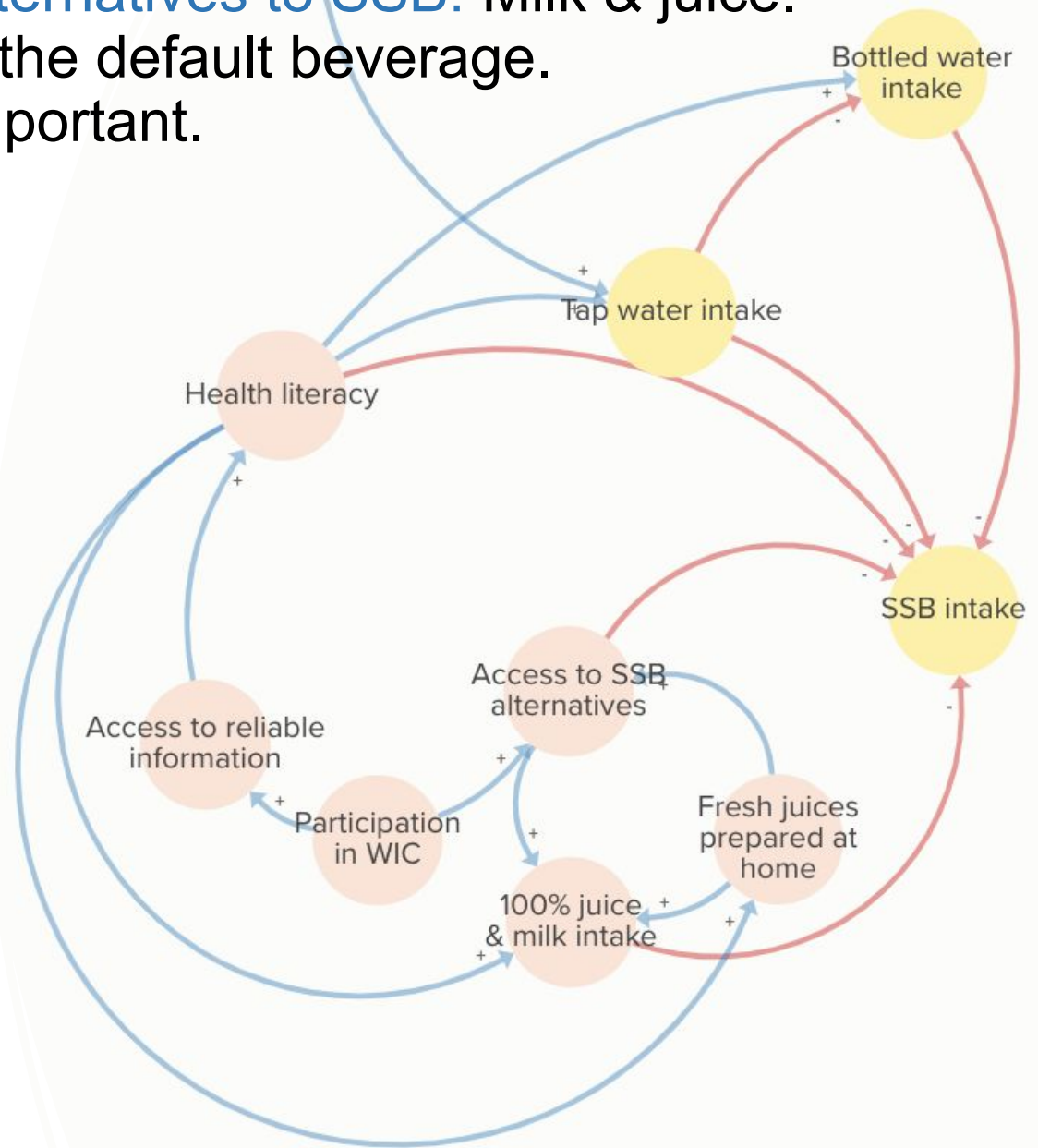
“Marketing is aggressive [...] becomes a source of information for the people.”



Key Finding 2: Alternatives to SSB: Milk & juice.

Suggest water is not the default beverage.
WIC subsidies are important.

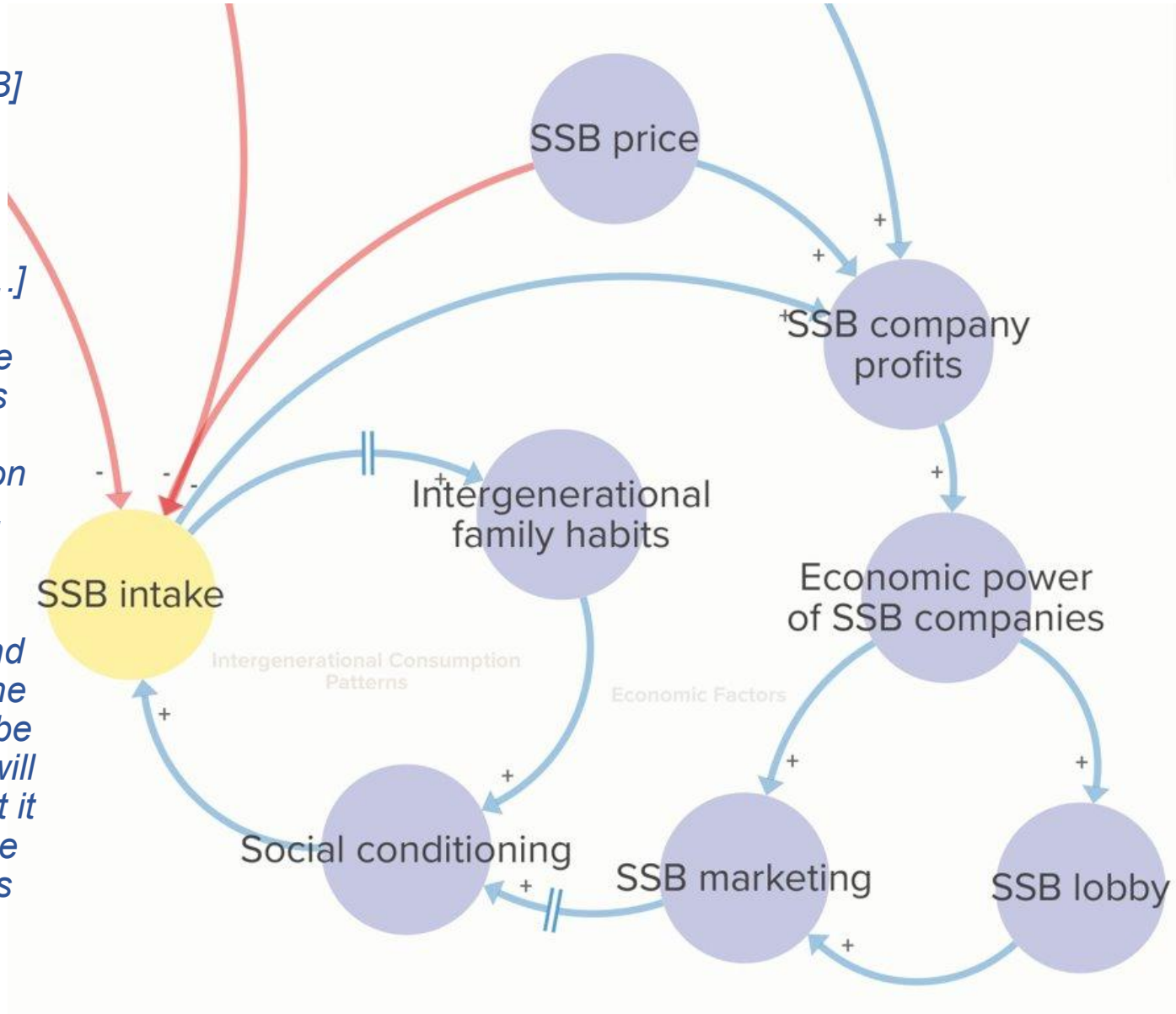
“my child loves juice way too much and I think my biggest fear is that the economy is too difficult, [...] I can't afford it.”



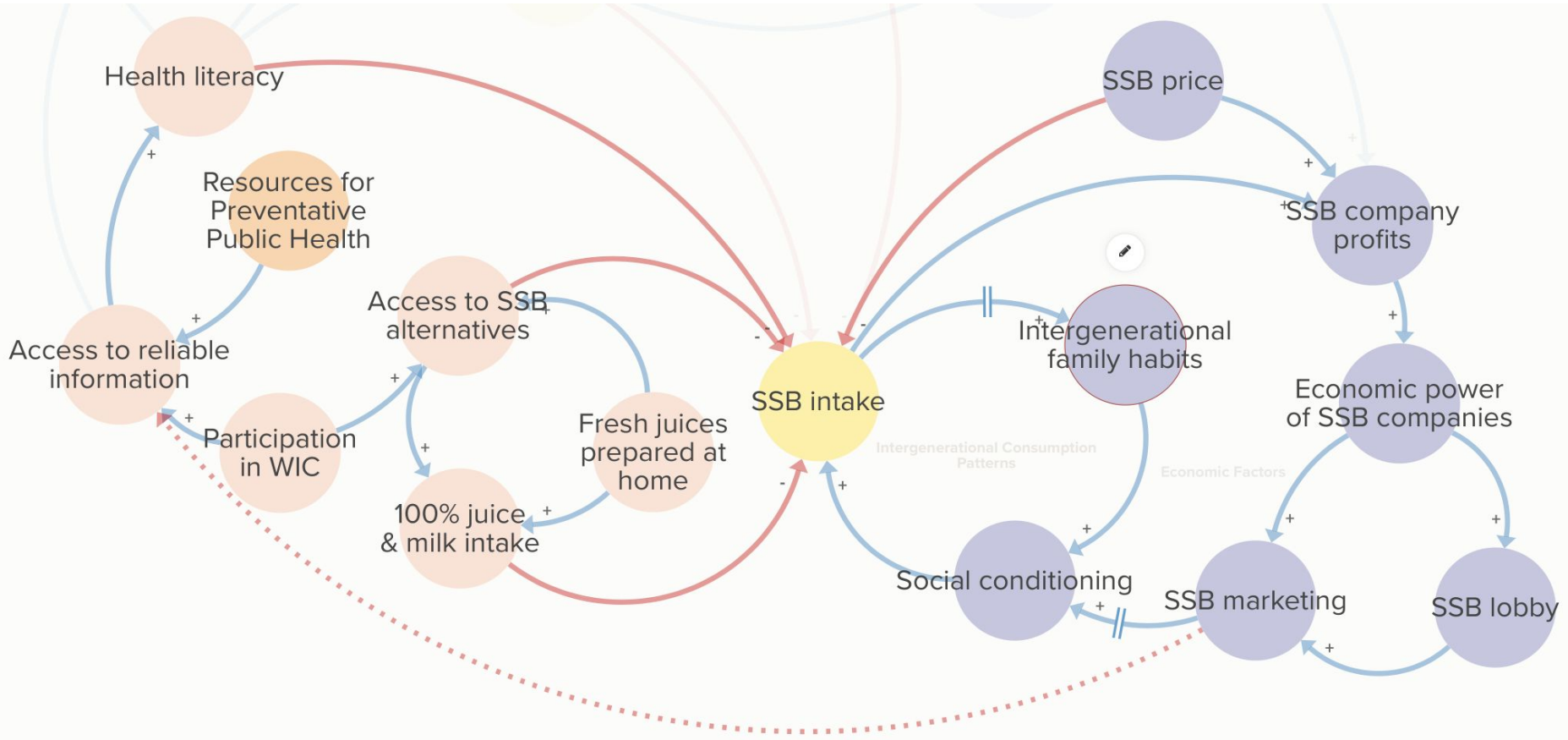
External Economic Factors

“Group 1: “Facilitator: Does production [of SSB] increase access/availability. It’s more than availability increasing production. Production increases, [...] Because is a political contract, in reality its the politics [...] All of this is thanks to the political contract these multimillion dollar companies have, which paves the way.

[...], and the lobbying and [...] water and sugar. The price [of production] will be minimal [...] Production will be more because of what it costs to produce with the price of sugar – which is minimal- the main ingredient is water.”



Investment in Health Promotion & Disease Prevention



[...]let's talk about the WIC program [...] an infant stays with WIC until they are one year old because we give them formula and formula is more expensive, so they are always going to come for that first year. But once they out grow formula, they stop coming to the WIC program. We have the potential of a 30% in that population of 1 – 5 year olds that do not come [...] free nutrition, a nutritionist... The WIC program invests a ton of money in nutritionists, and there is one in each town, so you have access to information, education and nutritious food. What is happening? [...]"

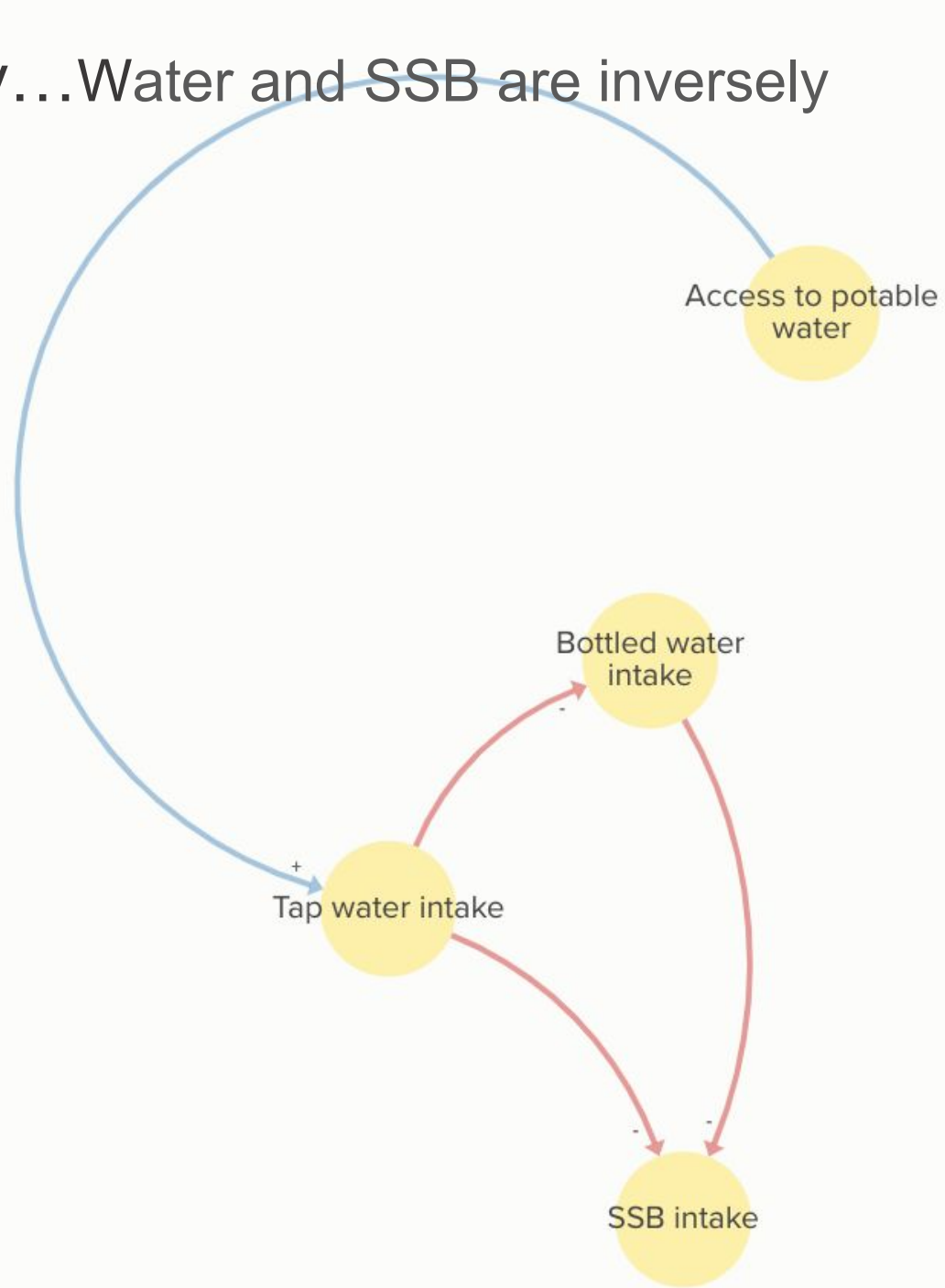
"I am in a position where I want my children to live better lives, better quality lives, and for them to have healthier diets, but how is that possible with \$25 from WIC?"

"They may offer educational forums and sessions nearby, this and that, but the time factor plus the pace of life nowadays, it's just not accessible for us. Sometimes we do want to attend these meetings but then my infant is sick [...] to get from here to a activity across town, What to do? I stay home caring for my sick child".

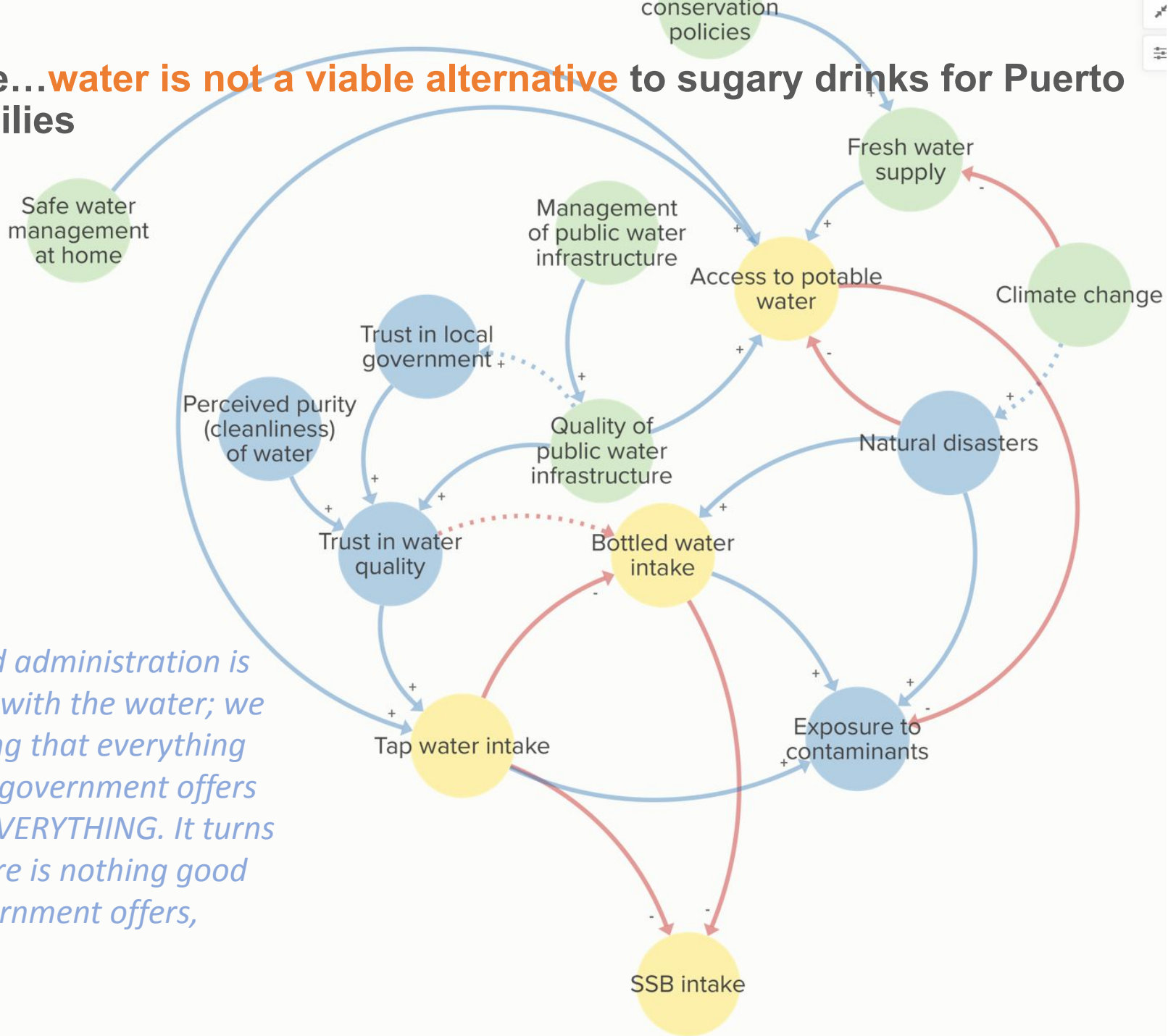
Key Finding 3: In theory...Water and SSB are inversely related

“As a result, sugary drink consumption decreases. More access to those products [safe tap water, bottled water], causes a reduction in sugary drinks which is the outcome we want.

This is how we connect the loop a bit.”



In practice...**water is not a viable alternative** to sugary drinks for Puerto Rican families



“The bad administration is not only with the water; we are saying that everything that the government offers is bad. EVERYTHING. It turns bad, there is nothing good the government offers, never.”

Recap: 3 Key Findings

1. **SSB Marketing**: intergenerational social conditioning
2. **SSB Alternatives**: milk & 100% fruit juice, facilitated by WIC
 - In PR, Infants & toddlers already score poor diet quality for overconsumption of these 'healthy' foods*
3. **Water**: not the default choice unless other conditions are met
 - Tap water relies on supplies, storage & delivery infrastructure and communication
 - Filtered tap: relies on purchasing power and education/monitoring
 - Bottled water: parents need purchasing power

Aligning Intersectoral Interests



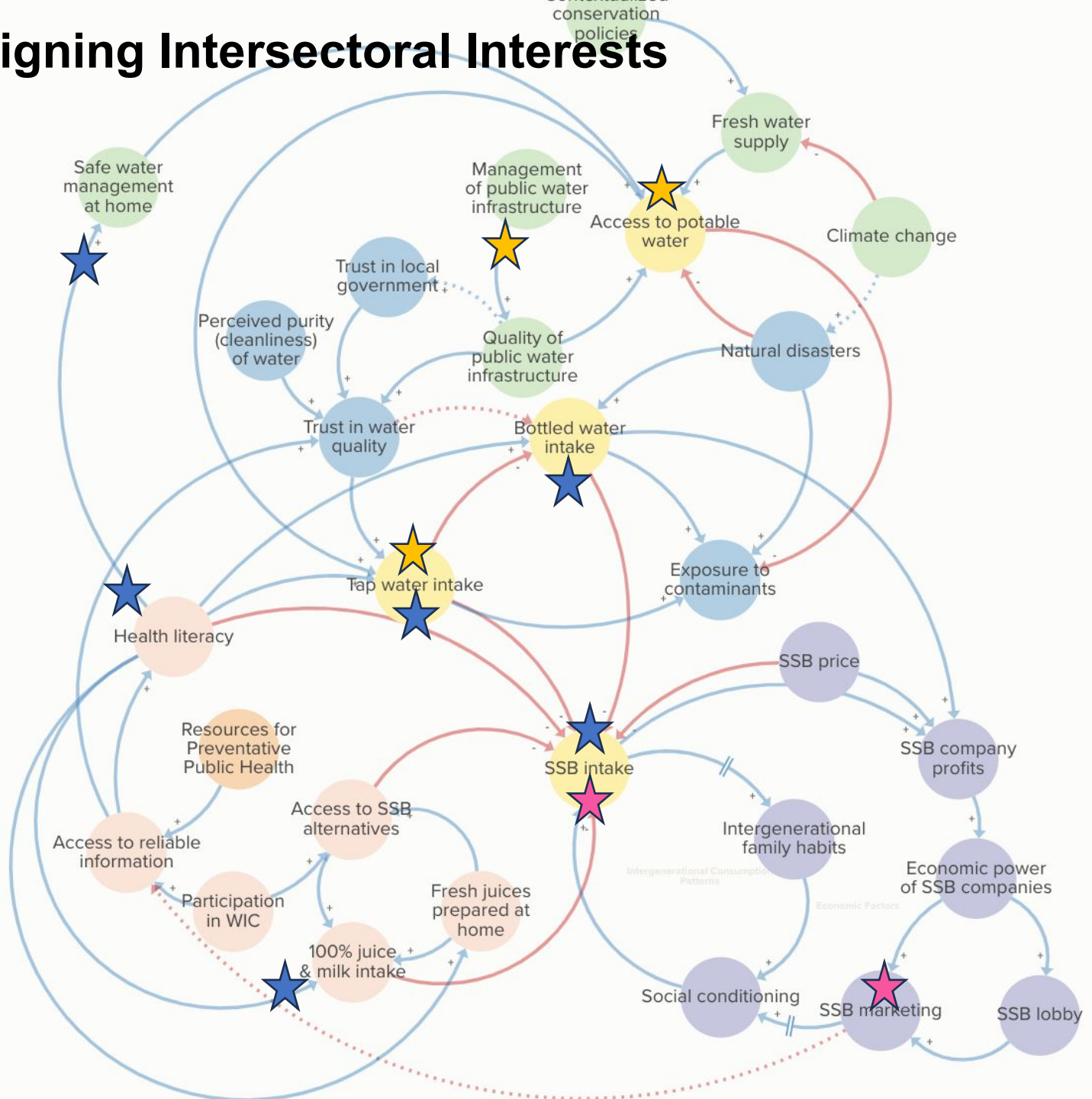
Rally climate, environmental conservation & water security advocates to invest in data infrastructure



Align campaigns & messages: climate, water & SSB



Limit or Counter marketing of SSB



Programmatic Barriers

Fiscal Crisis: Barriers to accessing resources

Lack of resources for preventive health initiatives, which impacts the proliferation of reliable health information.

The availability of resources is limited due to budget restrictions that affect public agencies in the context of the fiscal crisis. These challenges hinder the opportunity to grow the health educator workforce.

Some participants mentioned specific examples of recommendations that were not implemented due to lack of funding, such as the proposals of the Puerto Rico Food and Nutrition Commission.

Coordination

Participants expressed that agencies also experience challenges in coordinating among themselves, making it difficult to mobilize cohesive efforts.