

An Attempt to Optimize Panama's Water Treatment Process



https://www.seekpng.com/png/u2w7r5u2a9y3u2e6_tap-png-water-from-a-faucet-transparent/

Flint Eller (ME)
William Kennedy (ME)
Zachary Manfredi (CHE)
Benjamin Wheet (ECE)



WPI

11 October 2022



Introduction



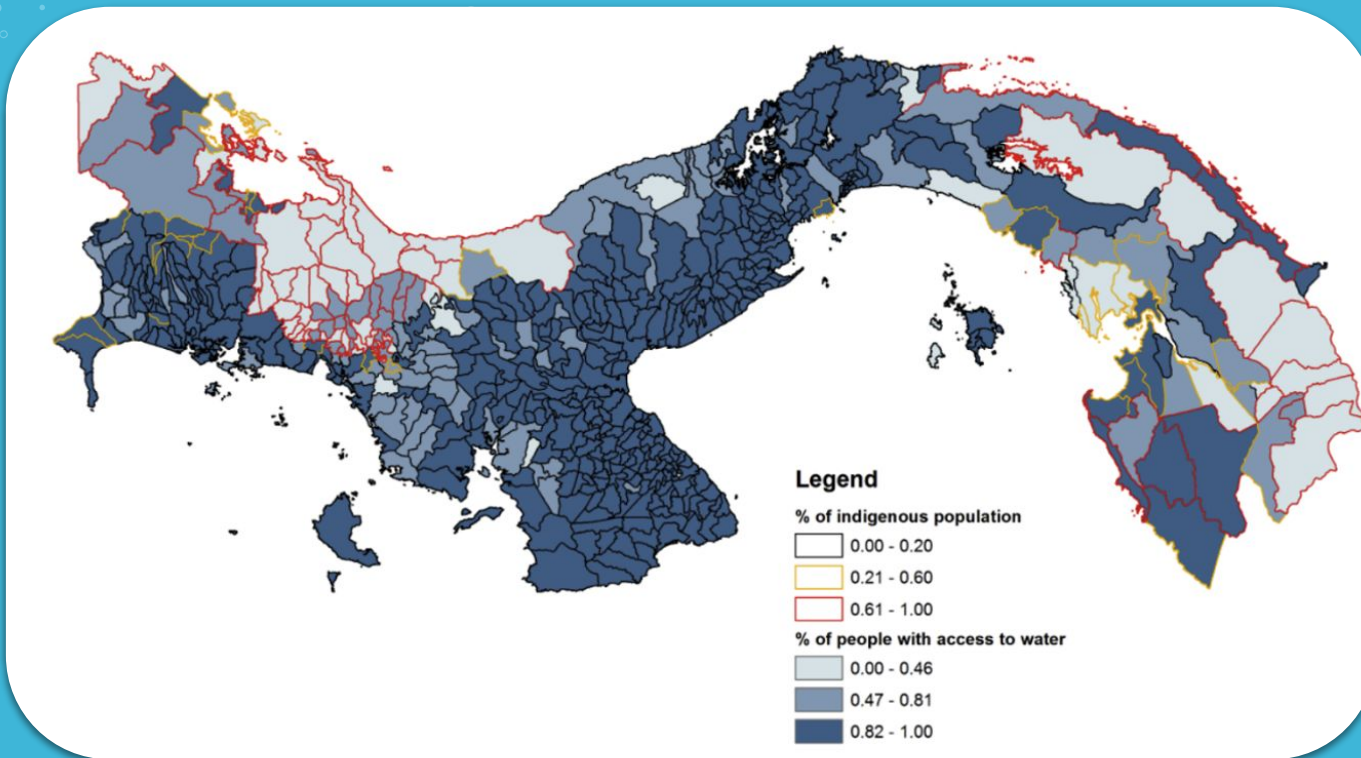
- The United Nations has declared drinking water to be a human right.
- Article 110 of the Panamanian constitution.
- Attempts to modernize
- IDAAN is the national water authority
- Rapidly Growing Population

Water In Panamá

- 119.5 billion m³ collected in freshwater streams yearly.
- Panama provides access to 92% of its population. Rural and indigenous populations account for most of the 8%.
- Lake Gatún (769 million m³) and Lake Alajuela (643 million m³)

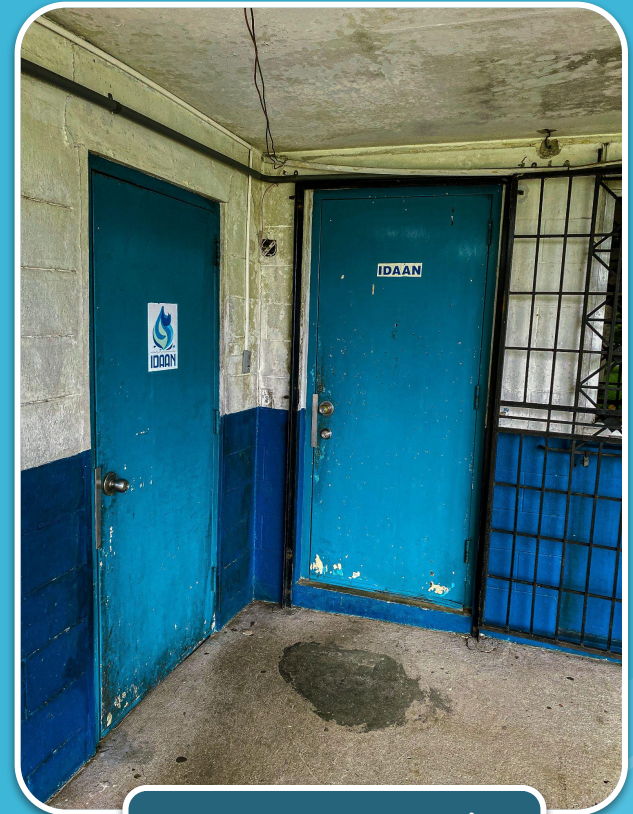


Disparity of Access in Panamá



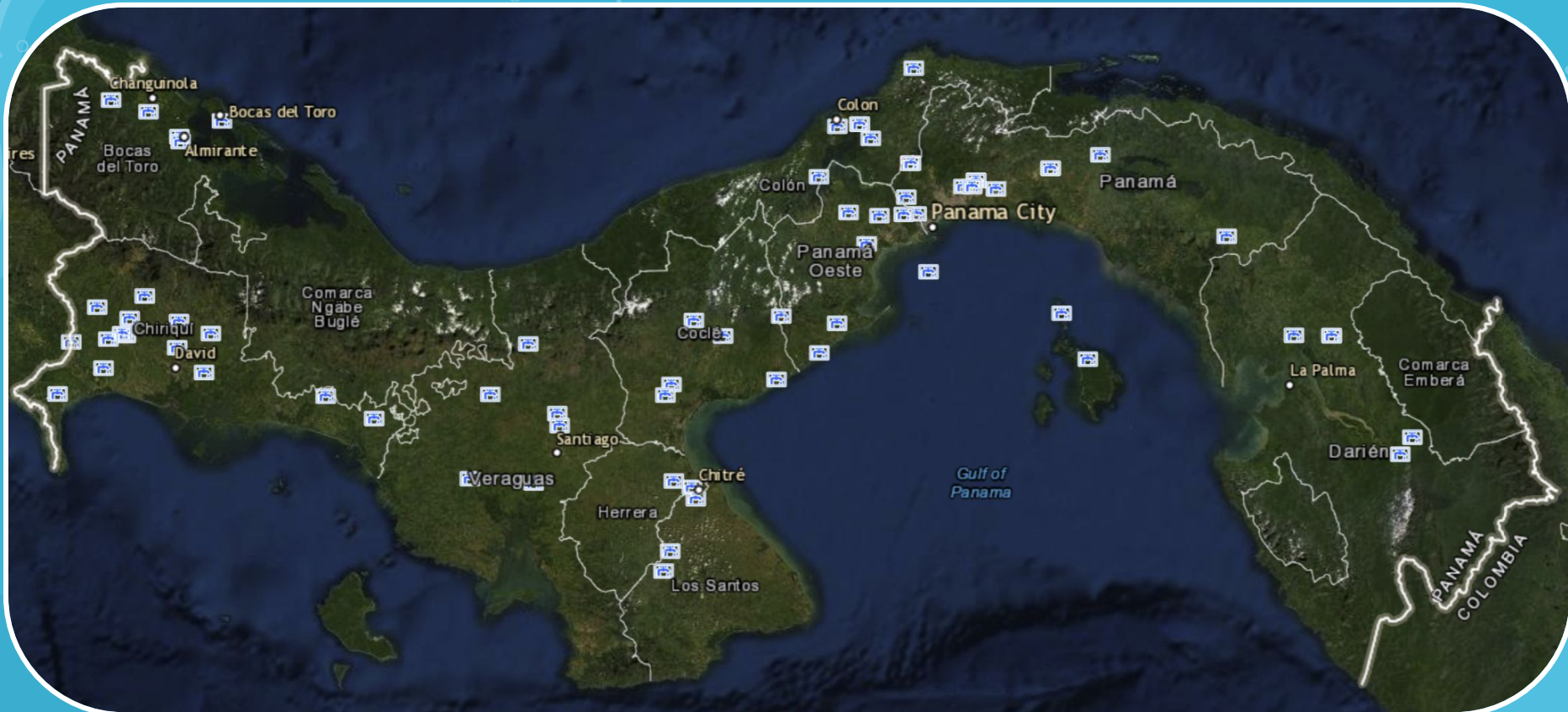
IDAAN Issues

- Lack of Staff and Funding in IDAAN
- Issues and irregularities with water access
 - Approximately 5% of population relies on Water tanks and trucks as opposed to direct access to homes.
- Internal Disorganization of IDAAN
 - Lack of communication between departments
 - Data/information not shared between sectors and plants of IDAAN
- External Disorganization of Water Access



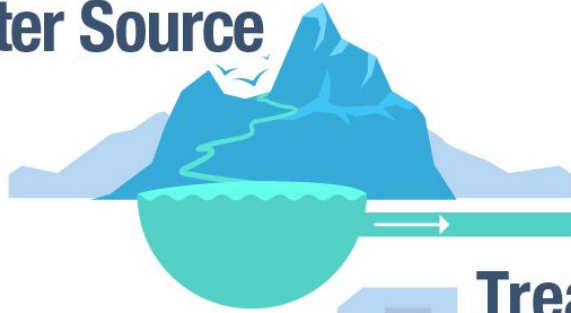
Entrance to IDAAN's
Corozal office

IDAAN Plants in Panama



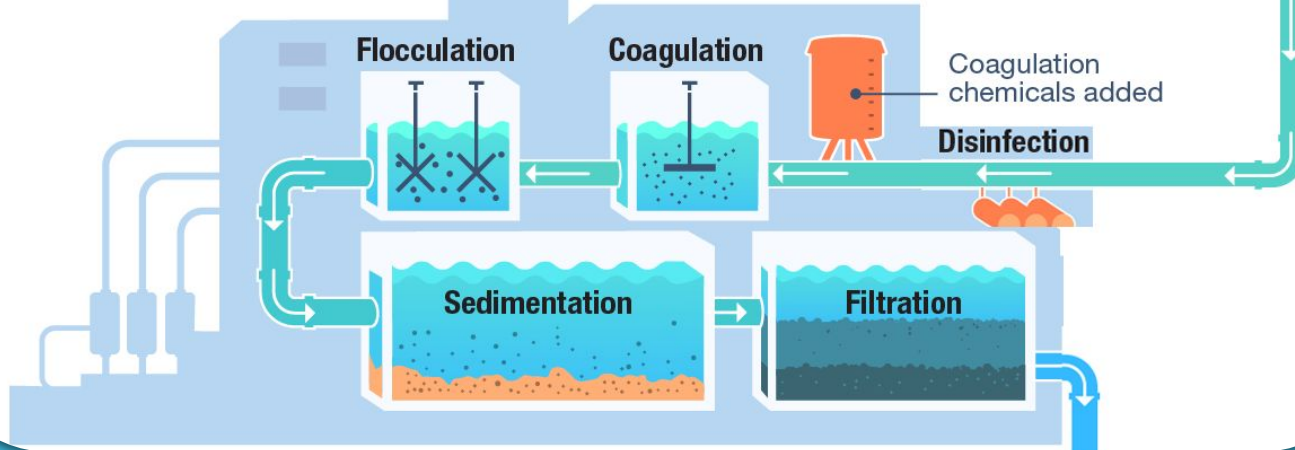
Water Processing

Water Source



Treatment Plant

(Makes water safe to drink)



Problem

IDAAN's plants not only gather their data inefficiently, but run in a way that promotes fragmentation by limiting collaboration between plants, thus creating many missed opportunities for improvement

Original Approach



1. Interview IDAAN personnel regarding the water plant infrastructure
2. Analyze data from IDAAN using statistical methods
3. Generate a report based on the data
4. Present what our findings mean for each plant involved

Objective 1

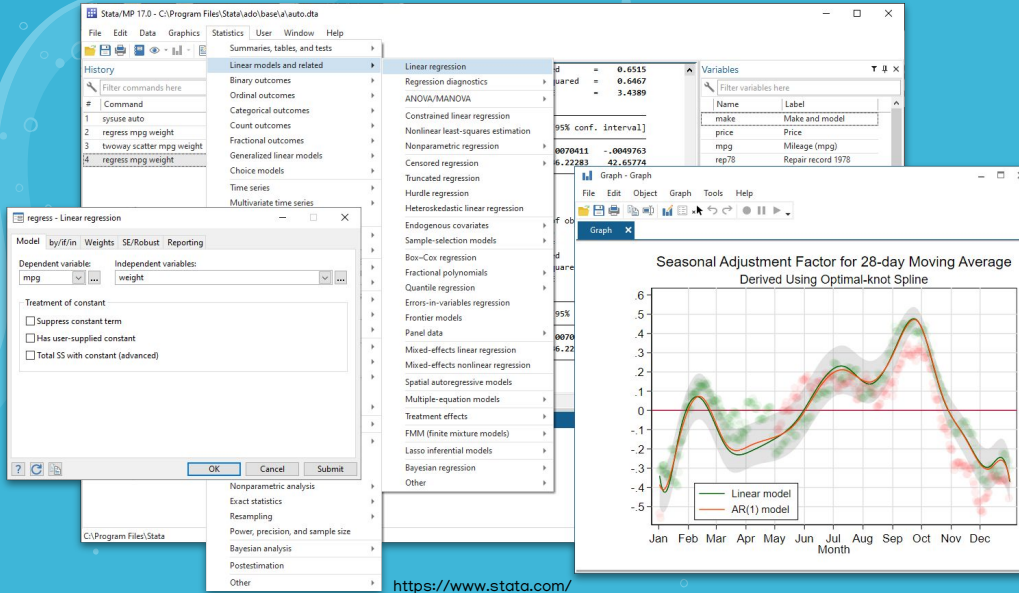
- We interviewed IDAAN personnel regarding the water plant infrastructure and treatment process
- We visited the Chilibre Water Plant and met with Javier Sanchez who has worked with IDAAN for nearly 30 years and currently works as Superintendent
- We also met the lab experts that test the water and decide what chemicals to use based on those tests



Objective 2

We planned to test hypotheses to find causal effects certain chemicals had on the output water. More specifically were hoping to look at:

- Crude/input water qualities: pH, turbidity, etc.
- Treatment chemicals: aluminum sulfate, cationic polymers, calcium hypochlorite, liquid chlorine, activated carbon, hydrated lime, and more.
- Treated/output water qualities: pH, turbidity, residual chlorine, etc.



<https://www.stata.com/>

STATA

<https://www.stata.com/>

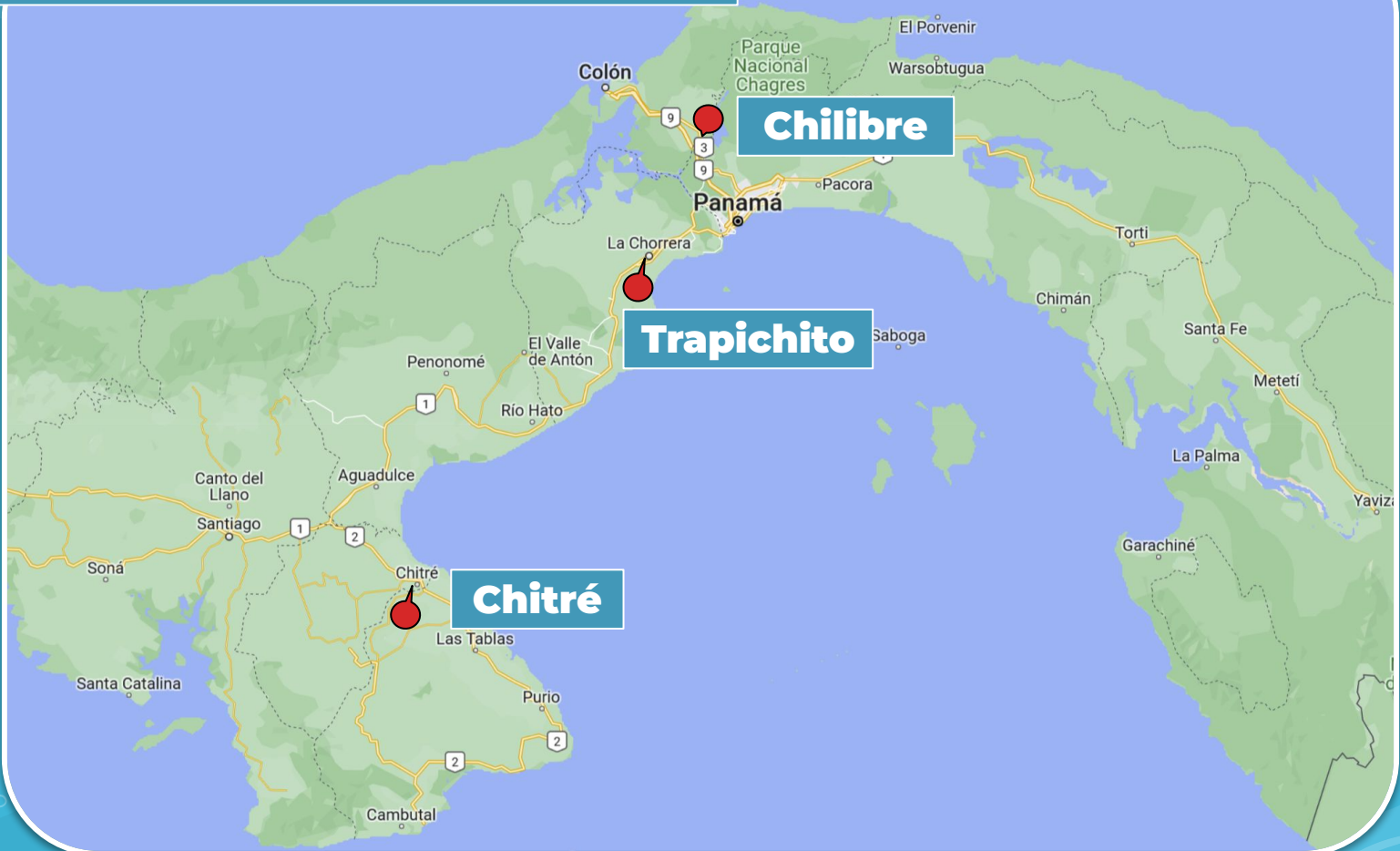


Power BI

<https://www.pei.com/is-power-bi-actually-useful/>

Then we planned to compare these effects between all 3 plants

Plants to Investigate



Objective 3

- Based on what our analysis might have uncovered, we had hoped to make recommendations to IDAAN on inefficiencies in their potable water plants

2021 Black & Veatch
Strategic Directions



Water Report

Objective 4



<https://www.kpifire.com/blog/5-simple-presentation-tips/>

- Then we planned to give presentations on our findings and explain how the analysis actually affects each plant

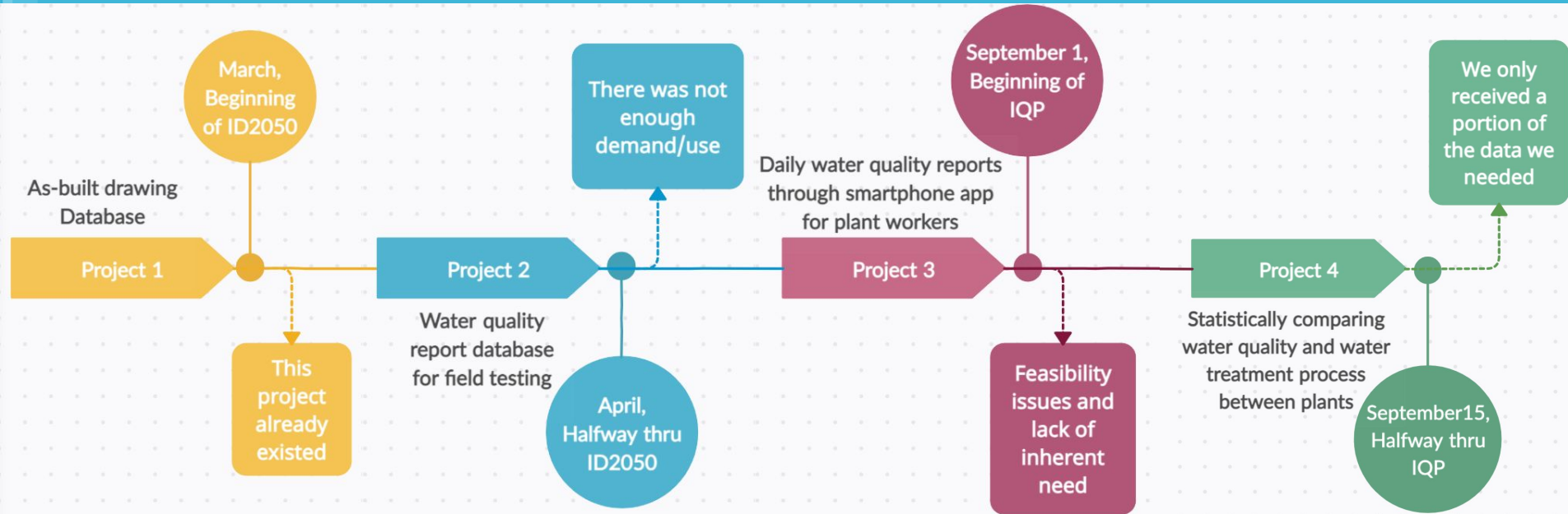
**What actually
happened**

Final Methods



1. Interview IDAAN personnel regarding the water plant infrastructure
2. Analyze data from IDAAN using statistical methods
3. Generate a report based on the data
4. Present what our findings mean for each plant involved

Timeline



Final Considerations

Issues we encountered

- Absence of a Sponsor
- Lack of Project Direction
- Slow Movement of Information

Habits we employed and recommend

- Comprehensive Documentation
- Establishment of Communication with Sponsor
- Transparency with Advisors



<https://www.facebook.com/FootprintPossibilities/>



<https://www.redbubble.com/poster/Gary-the-Snail-by-kepo28484716.LVTDI>



<https://www.a-social.ly/documentation/>



<https://atlice.com/library/how-to-create-a-culture-that-encourages-communication/>



<https://www.entrepreneur.com/growing-a-business/workplace-transparency-is-a-boon-if-your-company-culture240064>

Final Takeaway

- Project experienced many changes to which we had to adapt
- IDAAN's primary responsibility was not to give us a project
- The world is bigger than ourselves and we have to recognize that
- Go forth and be merry



Acknowledgments

Special Thanks to:

- Grant
- Jim
- Javier
- Jasmara
- CDS staff
- Chupitos

