



**AguaClara**

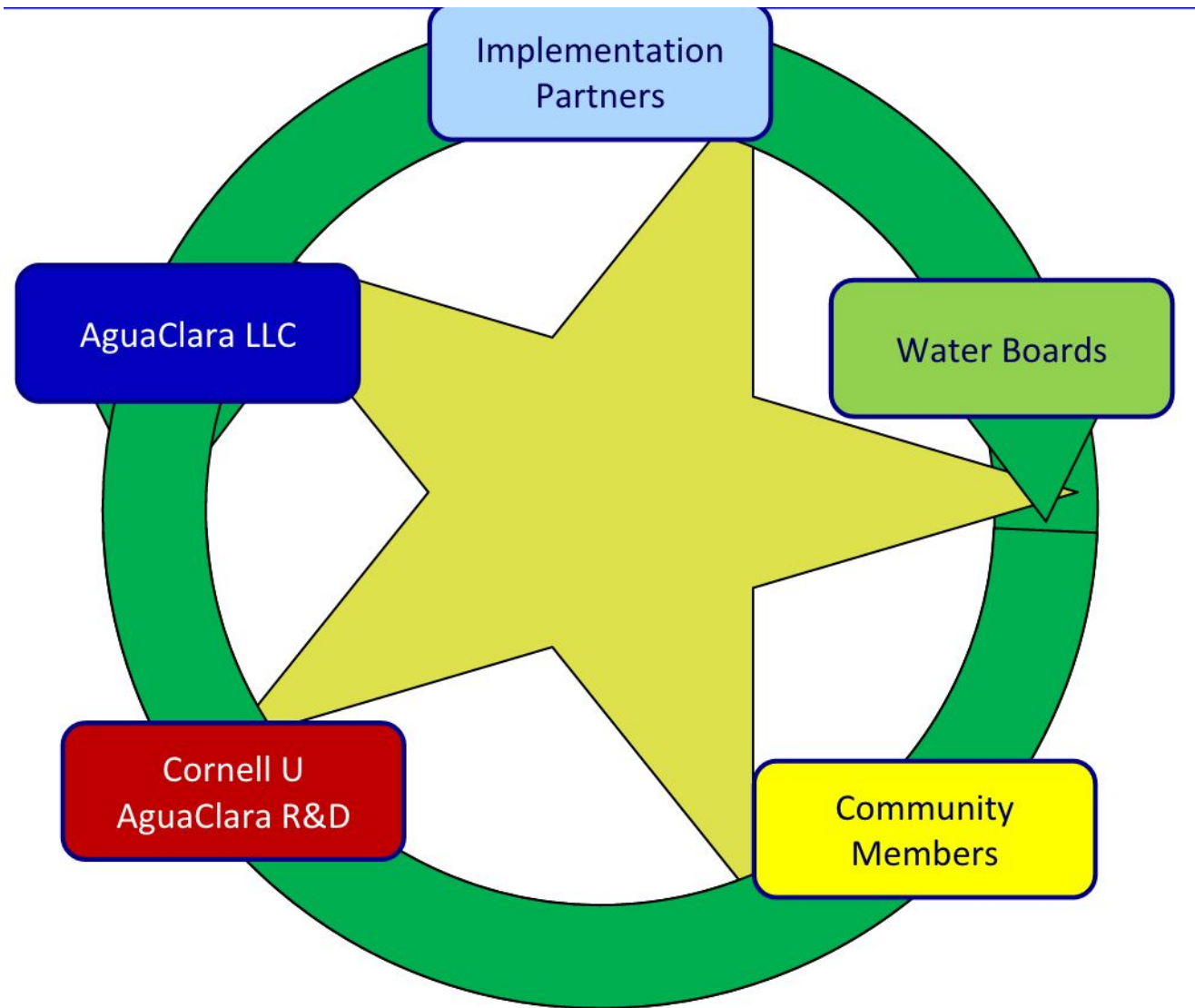
# **Plant Operations Smartphone Tracker**

**Ethan Keller, Sarah Sinclair, Drew  
Samuels, and Steven Niu**

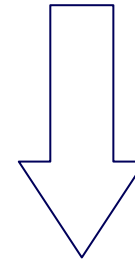
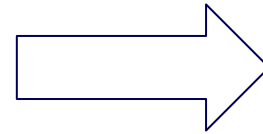


**Cornell University**

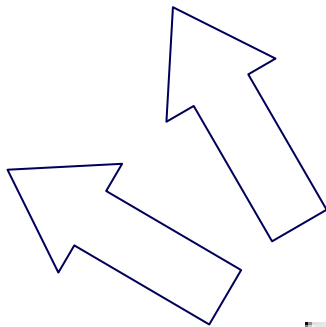
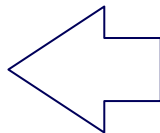
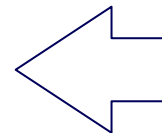
# What is POST?



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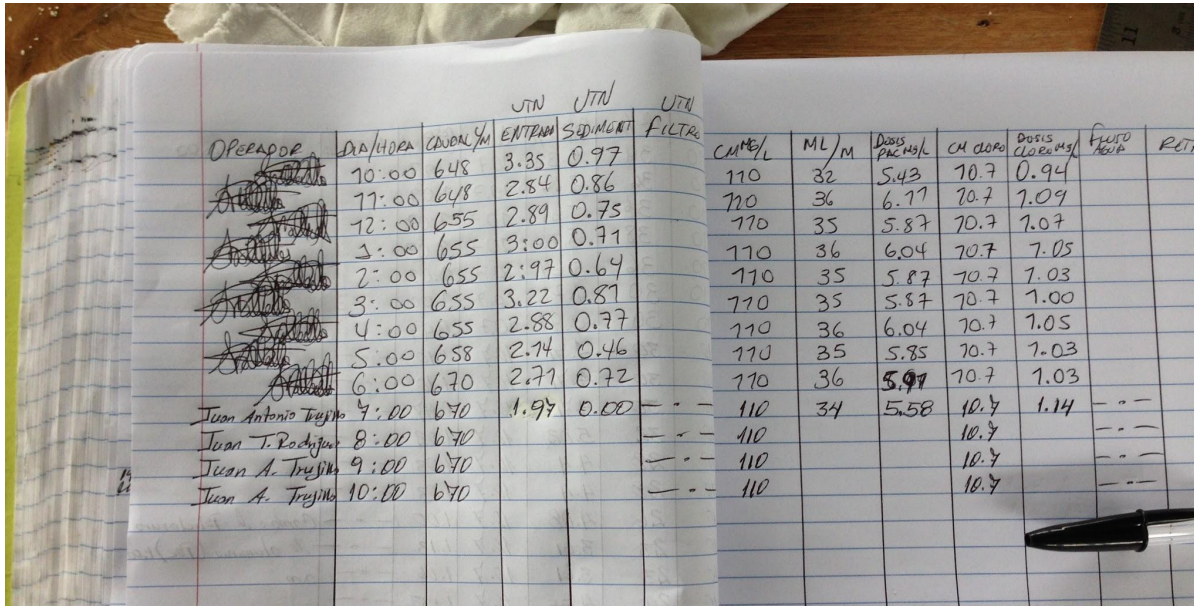
**MAGIC  
(Data Science)**



## ➤ Wash4All SMS entered daily:

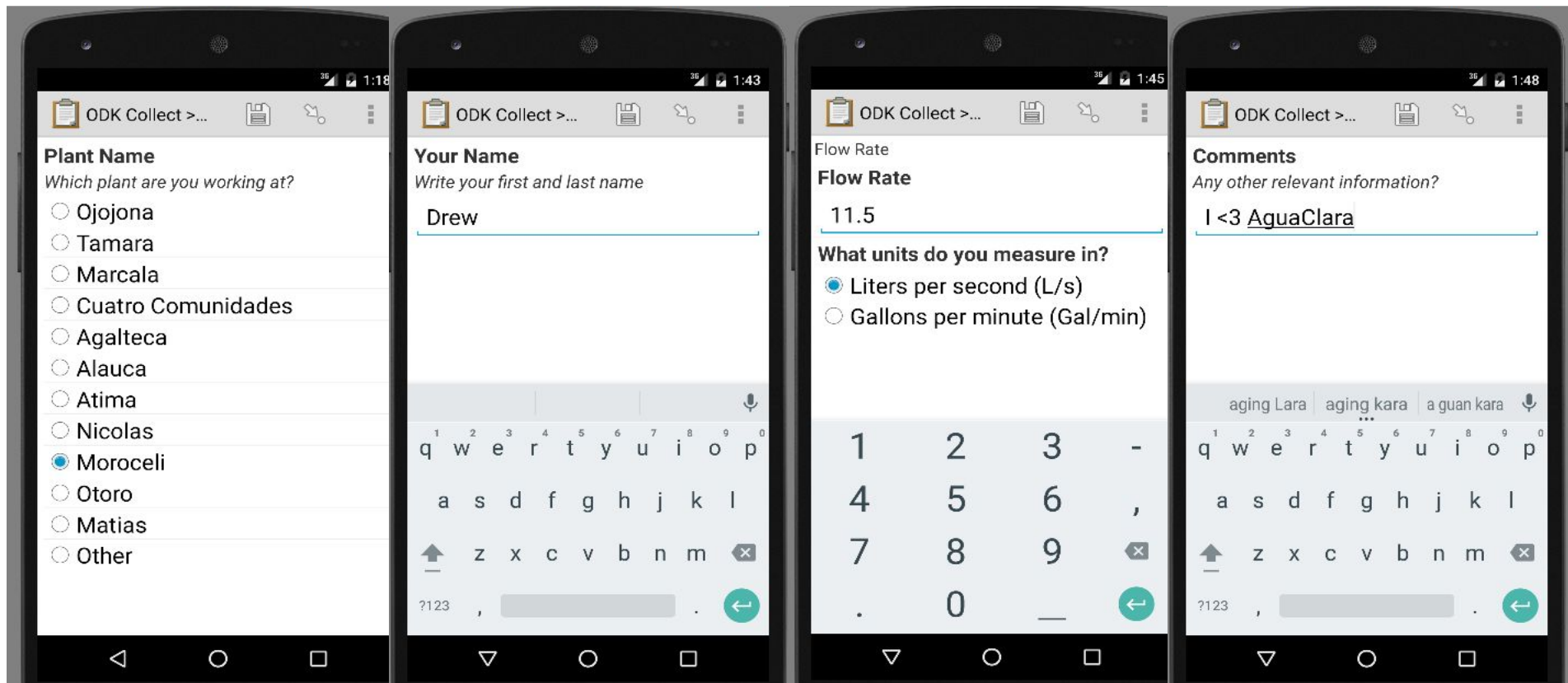
- "49010";"ati";"2016-01-07 11:20:47";"pctotal";1.3071903043688;"#cod ati #con ac2005 #cau 900 #tac 11.36 #tas 0.56 #coa 3.33 #clo 0.52 #com";"+50495262535";"Atima"

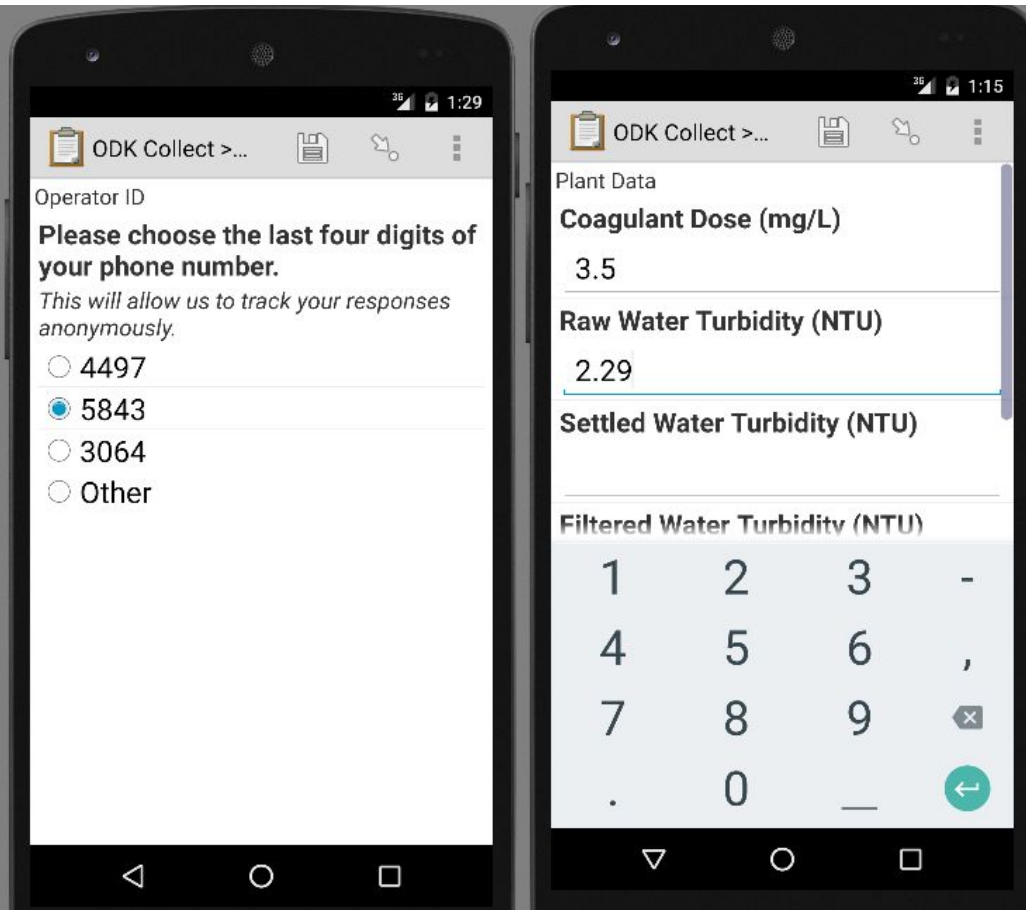
## ➤ Paper log



OPERADOR	DA/ HORA	CODAL/M	ENTRAM	SEDIMENT	FILTRO	CMPE/L	ML/M	Dosis PAC mg/L	CM CLORO	Dosis CLORO mg/L	FLEJO mg/L	RETRO
<del>Atima</del>	10:00	648	3.35	0.97		110	32	5.43	70.7	0.94		
<del>Atima</del>	11:00	648	2.84	0.86		120	36	6.17	70.7	1.09		
<del>Atima</del>	12:00	655	2.89	0.75		170	35	5.87	70.7	1.07		
<del>Atima</del>	1:00	655	3:00	0.71		170	36	6.04	70.7	1.05		
<del>Atima</del>	2:00	655	2:97	0.64		170	35	5.87	70.7	1.03		
<del>Atima</del>	3:00	655	3.22	0.81		170	35	5.87	70.7	1.00		
<del>Atima</del>	4:00	655	2.88	0.77		170	36	6.04	70.7	1.05		
<del>Atima</del>	5:00	658	2.74	0.46		170	35	5.85	70.7	1.03		
<del>Atima</del>	6:00	670	2.71	0.72		170	36	5.97	70.7	1.03		
Juan Antonio Trejillo	7:00	670	1.97	0.00		110	34	5.58	10.7	1.14		
Juan T. Rodriguez	8:00	670				110			10.7			
Juan A. Trejillo	9:00	670				110			10.7			
Juan A. Trejillo	10:00	670				110			10.7			

# Aggregate Console





ODK Collect >...

Operator ID

Please choose the last four digits of your phone number.

*This will allow us to track your responses anonymously.*

4497

5843

3064

Other

Plant Data

Coagulant Dose (mg/L)

3.5

Raw Water Turbidity (NTU)

2.29

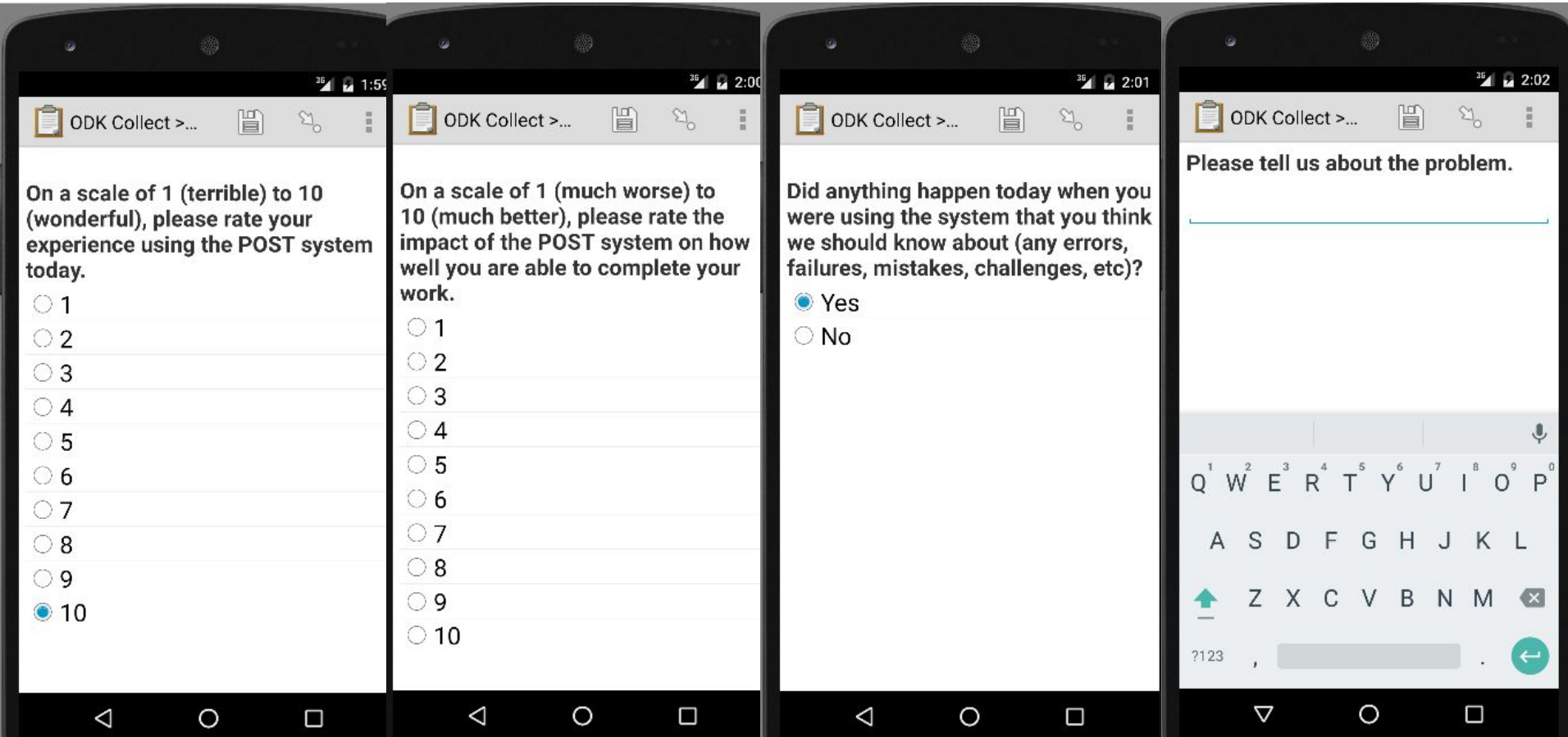
Settled Water Turbidity (NTU)

Filtered Water Turbidity (NTU)

1	2	3	-
4	5	6	,
7	8	9	✕
.	0	—	←

- Anonymized
- Choose to:
  - Report a backwash
  - Enter plant data
  - Report necessary maintenance
  - Report performed maintenance
- All data questions on one screen

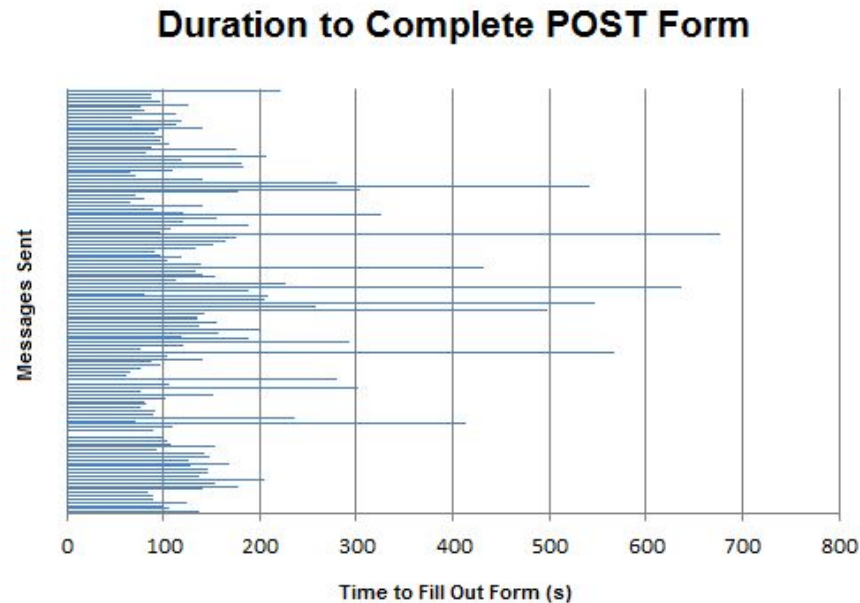
# Feedback Collection



The image displays four sequential screenshots of a mobile survey application (ODK Collect) on a smartphone. The survey is titled "ODK Collect >..." and is being completed at 2:00 PM. The survey consists of four questions:

- Question 1:** "On a scale of 1 (terrible) to 10 (wonderful), please rate your experience using the POST system today." The response is 10.
- Question 2:** "On a scale of 1 (much worse) to 10 (much better), please rate the impact of the POST system on how well you are able to complete your work." The response is 10.
- Question 3:** "Did anything happen today when you were using the system that you think we should know about (any errors, failures, mistakes, challenges, etc)?" The response is "Yes".
- Question 4:** "Please tell us about the problem." This is an open-text question with a keyboard visible below the screen.



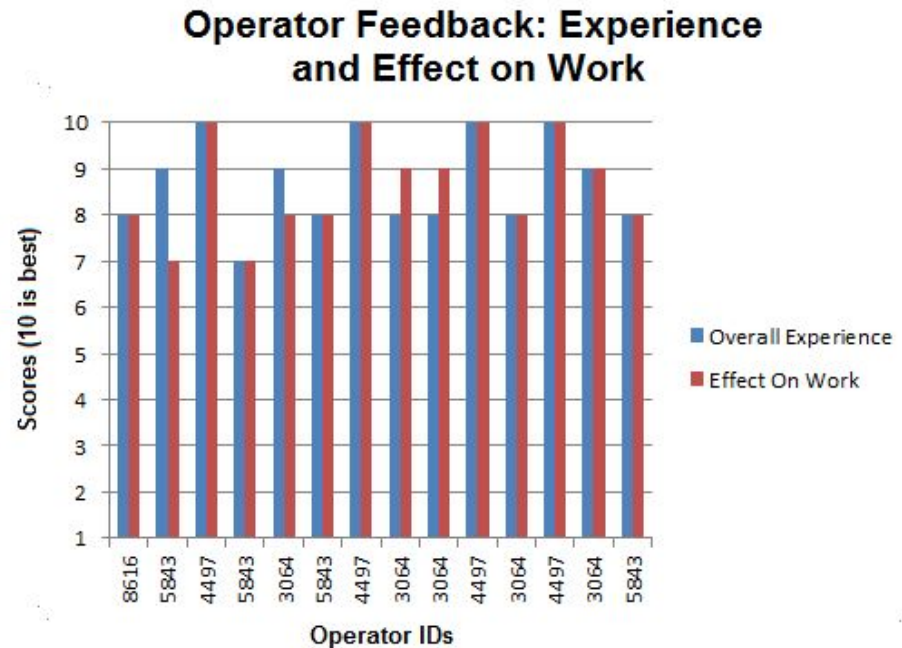


- First version deployed in Morocelí, Honduras
- Operators uploading an average of once per hour
- Takes about two minutes to fill out

# Feedback Results

“ Sí, me ha ayudado porque este trabajo no es solamente en el cuaderno, nos ayuda también el teléfono, debemos de irnos actualizando. Es una forma de ir saliendo o dejar de la rutina, aspirar a otras cosas, ir aprendiendo, actualizando. ”

“Yes, it's helped me because this work isn't just in the notebook, the phone helps us too, we should continue updating ourselves. It's a way to leave our routine, to improve and learn and update ourselves.”

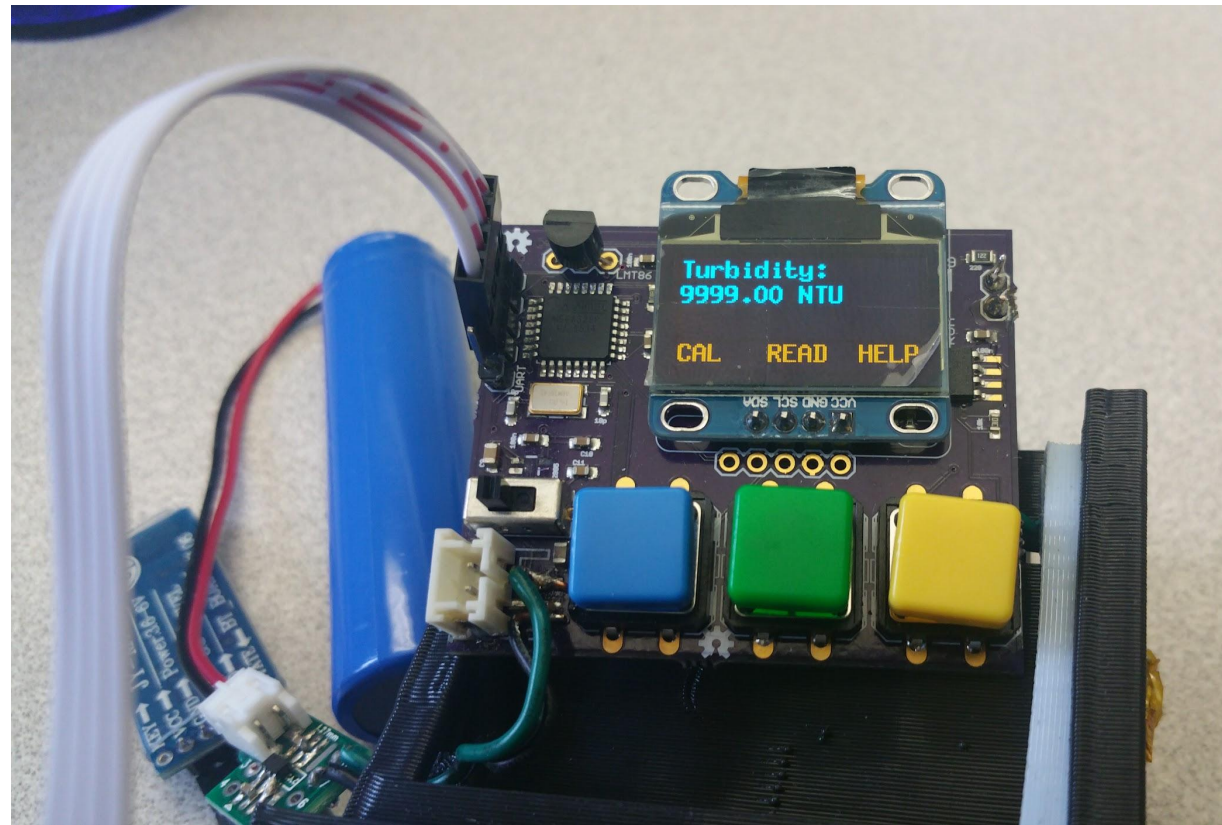


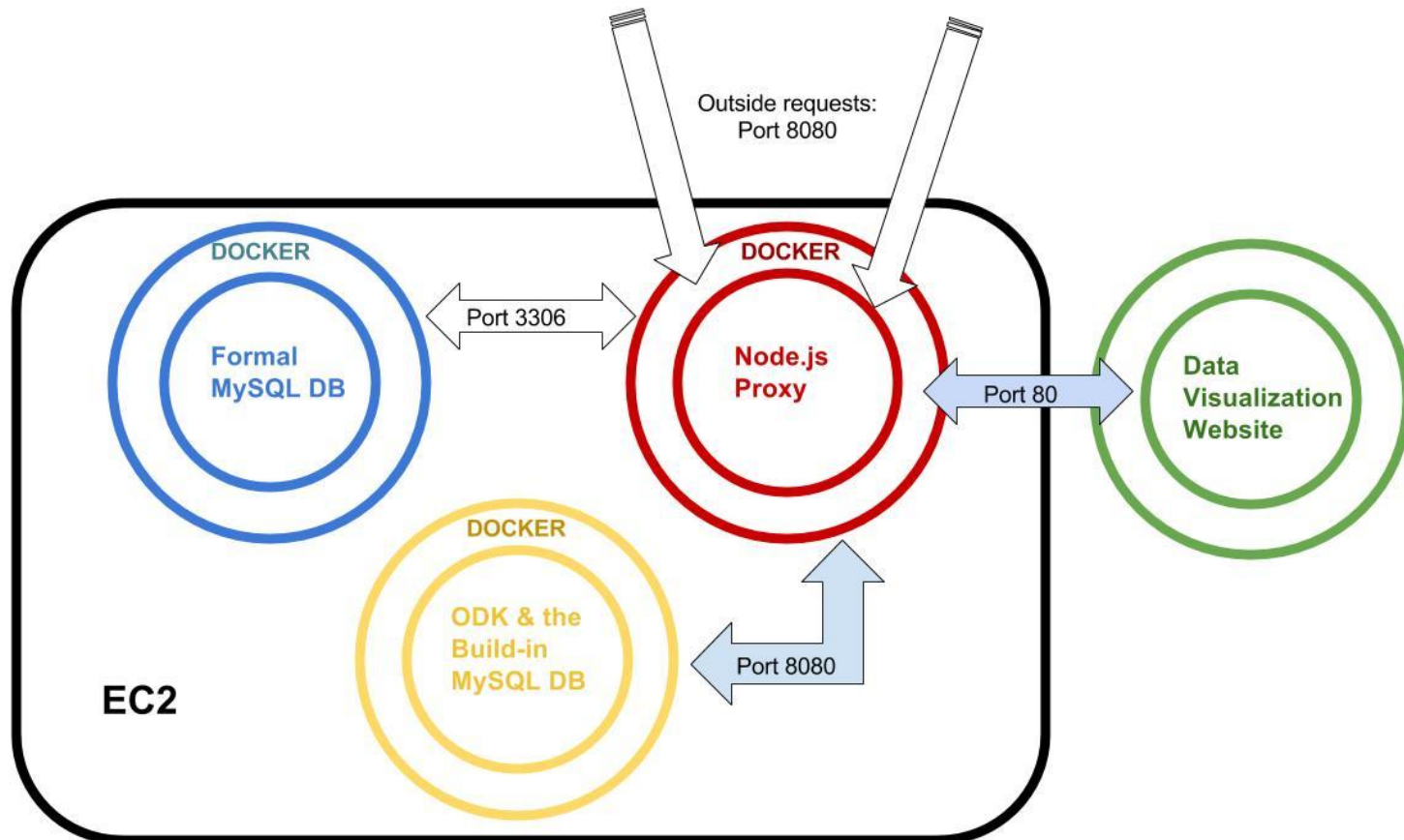
## ➤ Pros

- Inexpensive
- Inline option
- Direct connection to POST

## ➤ Challenges

- Accuracy
- Reliability

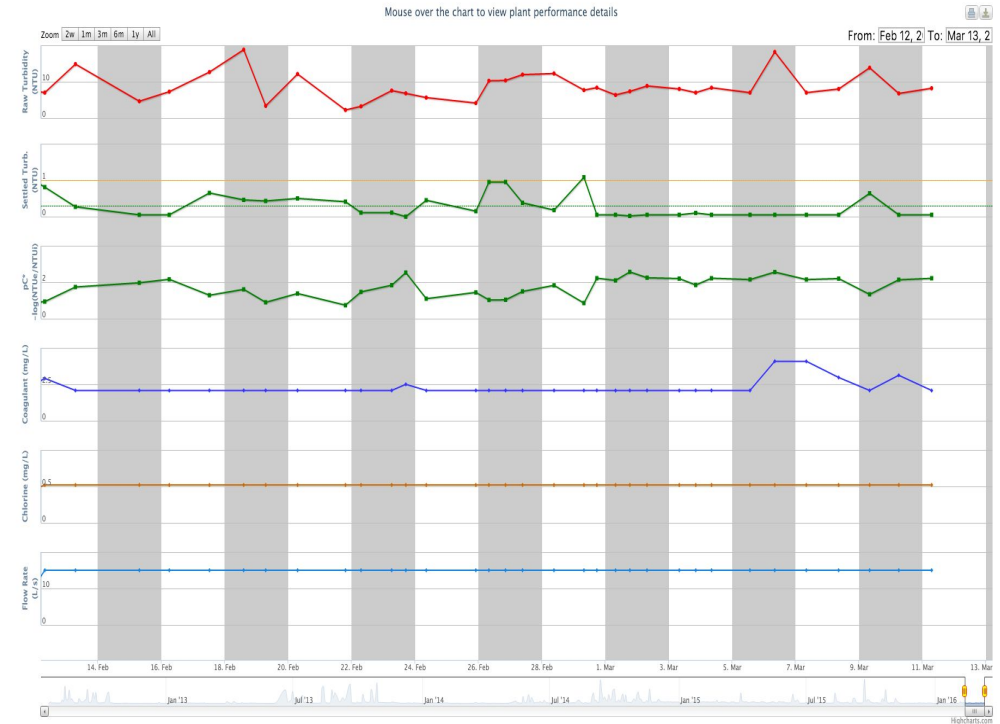


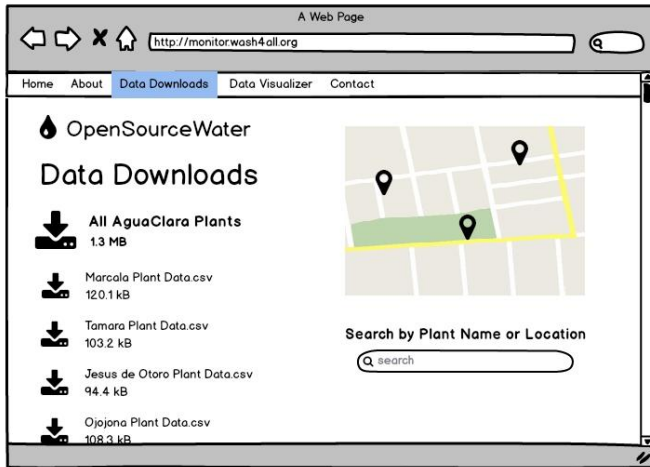




# AguaClara Current Data Visualizations

- Data v. Time:
- Cl dose
  - Coagulant dose
  - Flow rate
  - $pC^*$
  - Turbidities





OpenSourceWater

Monitor the performance of AguaClara plants in Honduras in real time!

Data Downloads

- Muroc66.csv [DOWNLOAD](#)
- Tamara.csv [DOWNLOAD](#)
- SanMateas.csv [DOWNLOAD](#)

About OpenSourceWater

Billions of people make do with unsafe water and inadequate sanitation. Treatment, development projects that aim to fix this frequently cost too much, achieve too little, and leave little or no public record. WASH4 All is tracking the path towards universal access to water and sanitation by mapping the world's knowledge of where these needs are unmet, who is working to meet them, and how.

Made by Mapbox



# Proposed Visualizations??



IDEAS?

- Finish/launch visualization website
- Continue to collect feedback and iterate
- Integrate Bluetooth turbidimeter
- Machine learning + trend predictions



# Questions?

