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Approvisionnement en eau d'urgence: La crise des Rohingyas au Bangladesh

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Territory acknowledgement

We acknowledge with respect the Lekwungen peoples on whose traditional territory the University of Victoria stands and the Songhees, Esquimalt and WSÁNEĆ peoples whose historical relationships with the land continue to this day.

We also acknowledge that the land on which ULaval stands is the traditional territory unceded territory of the Abenaki and Wabenaki Confederacy and the Wolastoqiyik.

Background

Civil Engineering (1999) MSc (2001) PhD (2005)

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KU THE UNIVERSITY OF KANSAS

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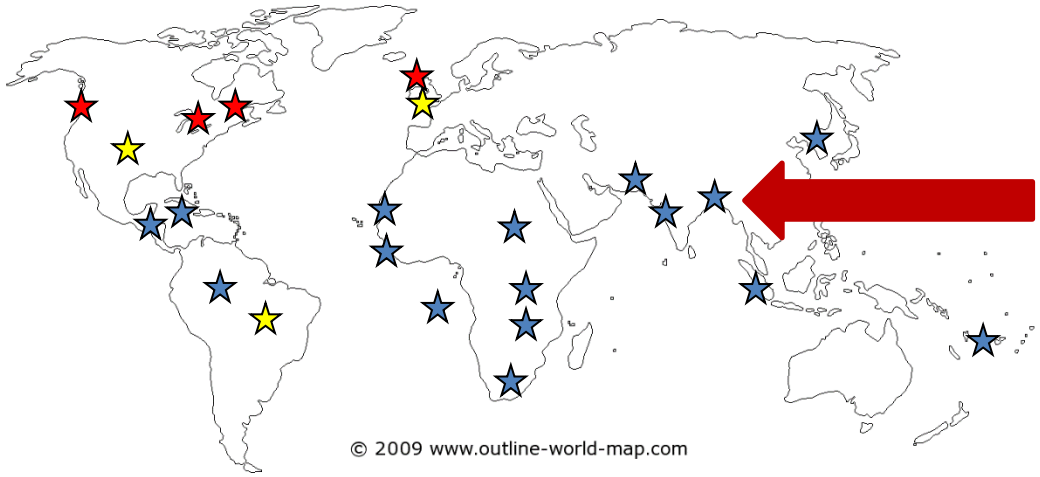

PDF (2006) Lecturer (2007) Assis. Prof. (2011) Assoc. Prof. (2017)

Health Canada

University of Glasgow

UNIVERSITÉ LAVAL

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Oxfam

World Health Organization

GOAL

Canadian Red Cross
Croix-Rouge canadienne

unicef

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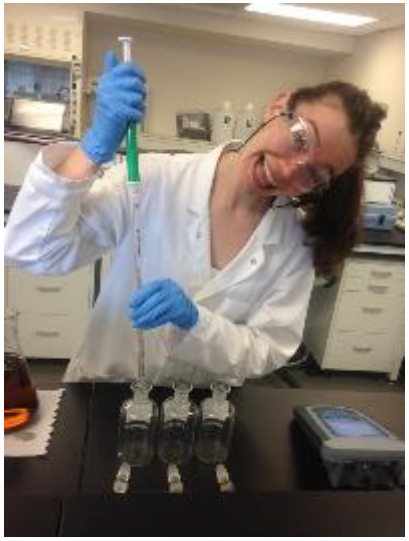

Low-resource

Lab

Water

Sanitation

Field

High-resource

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Rohingya crisis

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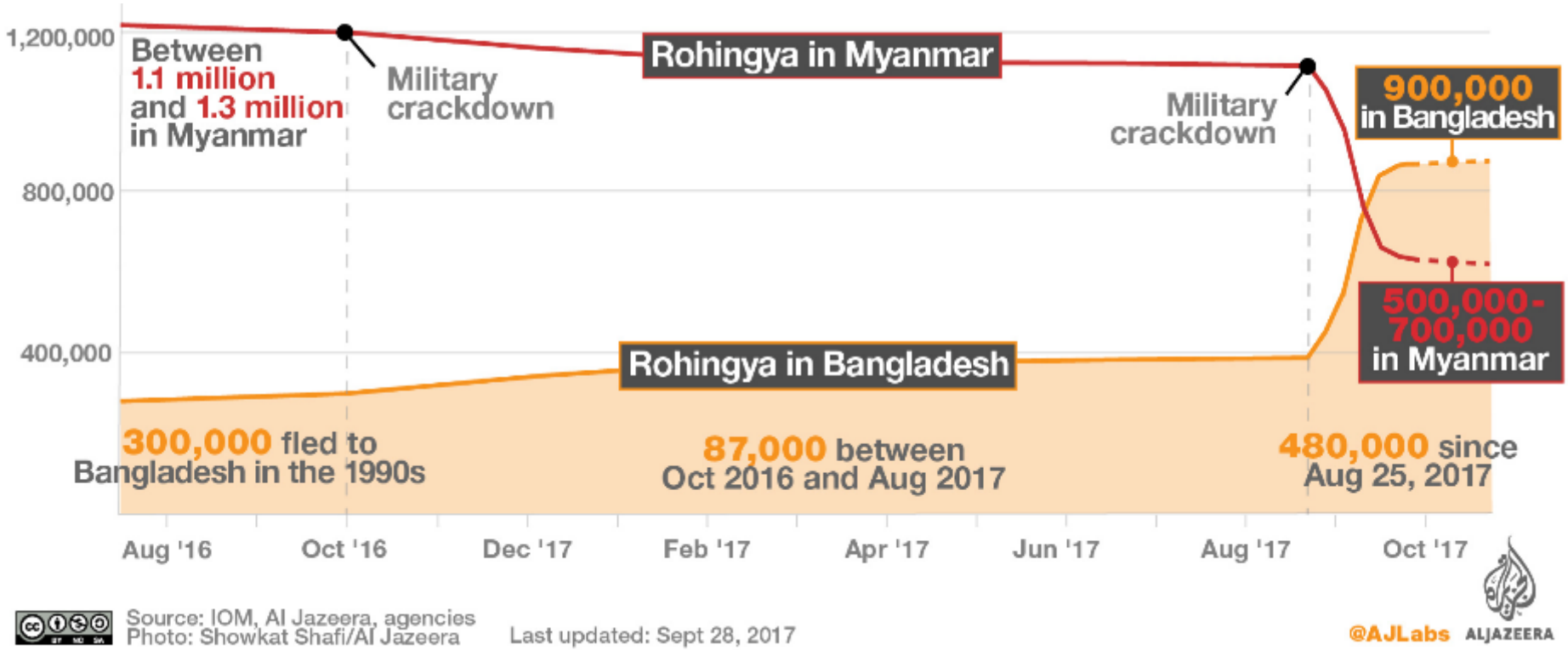
Rohingya crisis



Source: IOM, Al Jazeera, agencies
Photo: Showkat Shafi/Al Jazeera

Last updated: Sept 28, 2017

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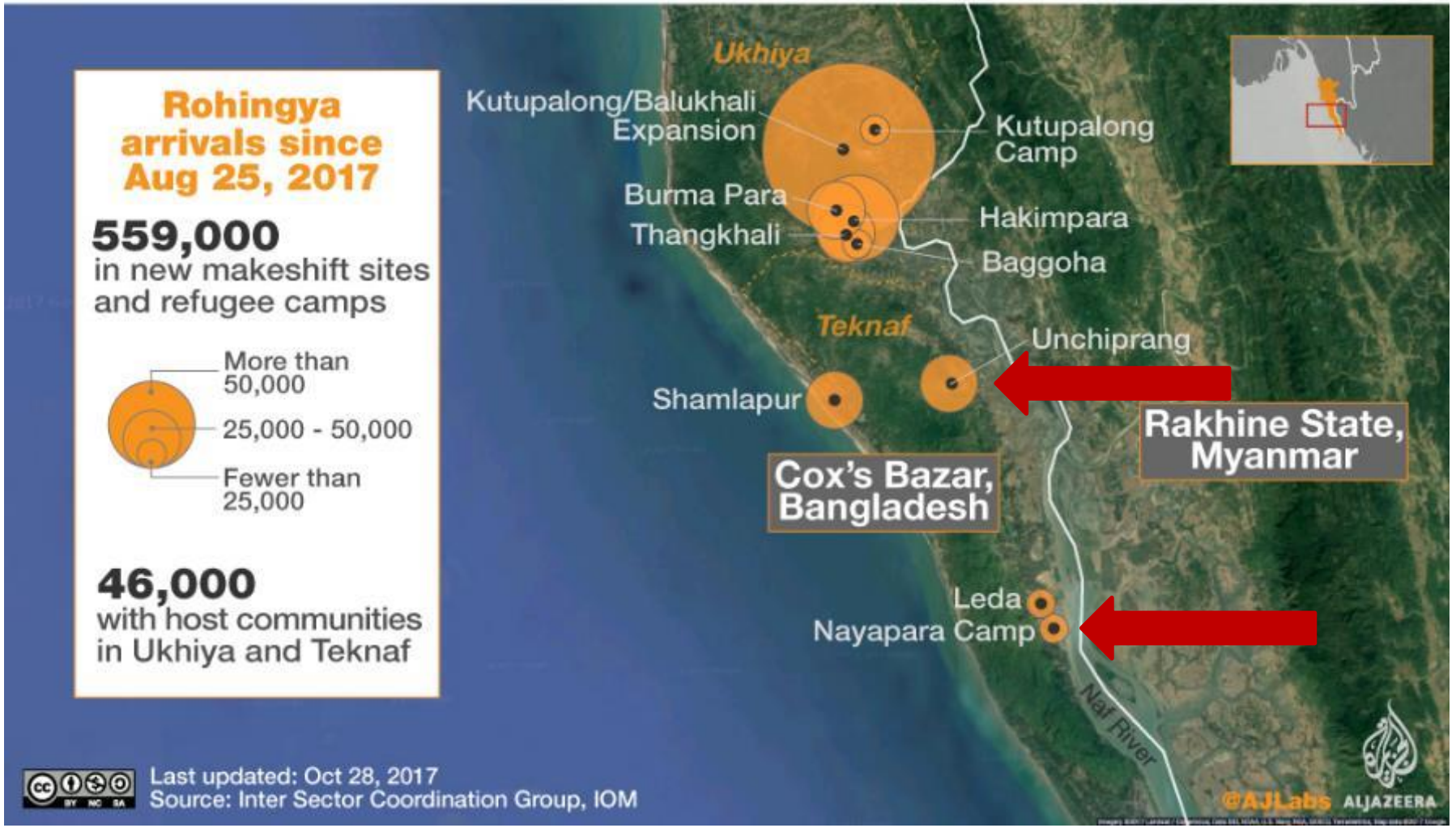
Rohingya crisis

Refugee settlements in Cox's Bazar

Around **605,000** Rohingya have fled to Bangladesh since August 25, 2017, mostly residing in temporary makeshift settlements.



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SWAT: surface water treatment

Problem:

Too much alum being used… is dosing right? How to cut down costs? Taste issues… Al residuals?

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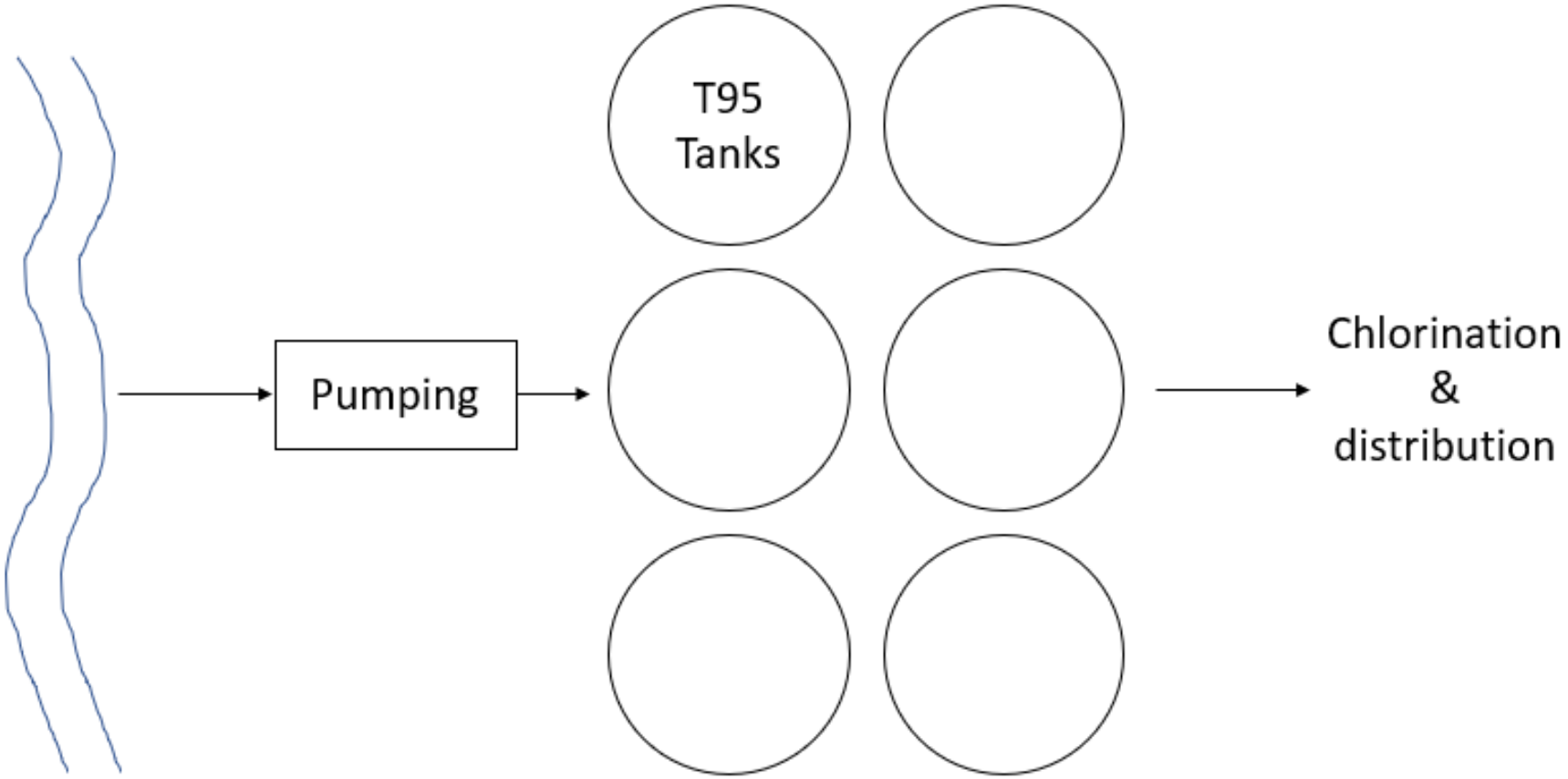
Oxfam's response: SWAT in camp 22 & 26



Alum dosing for "batch" water treatment

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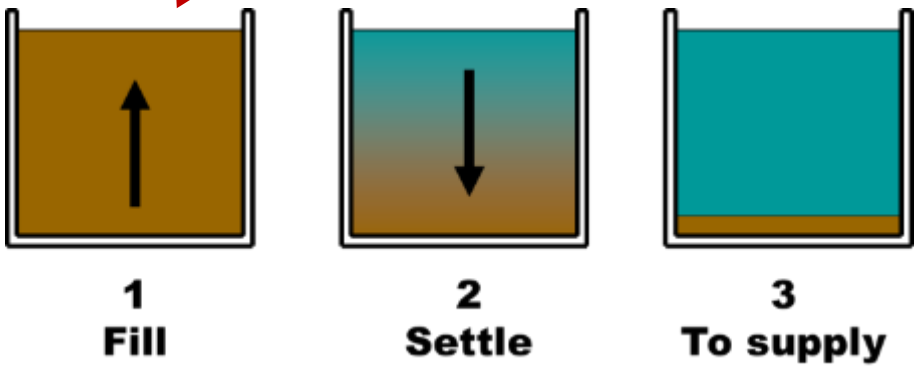
“Batch” water treatment

Oxfam Tank
11, 45, 70 or 90 m^3

“Batch” water treatment

Aluminium sulfate



Settling

Chlorination

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SWAT: raw water intake

Camp 22

Camp 26

Pumping station

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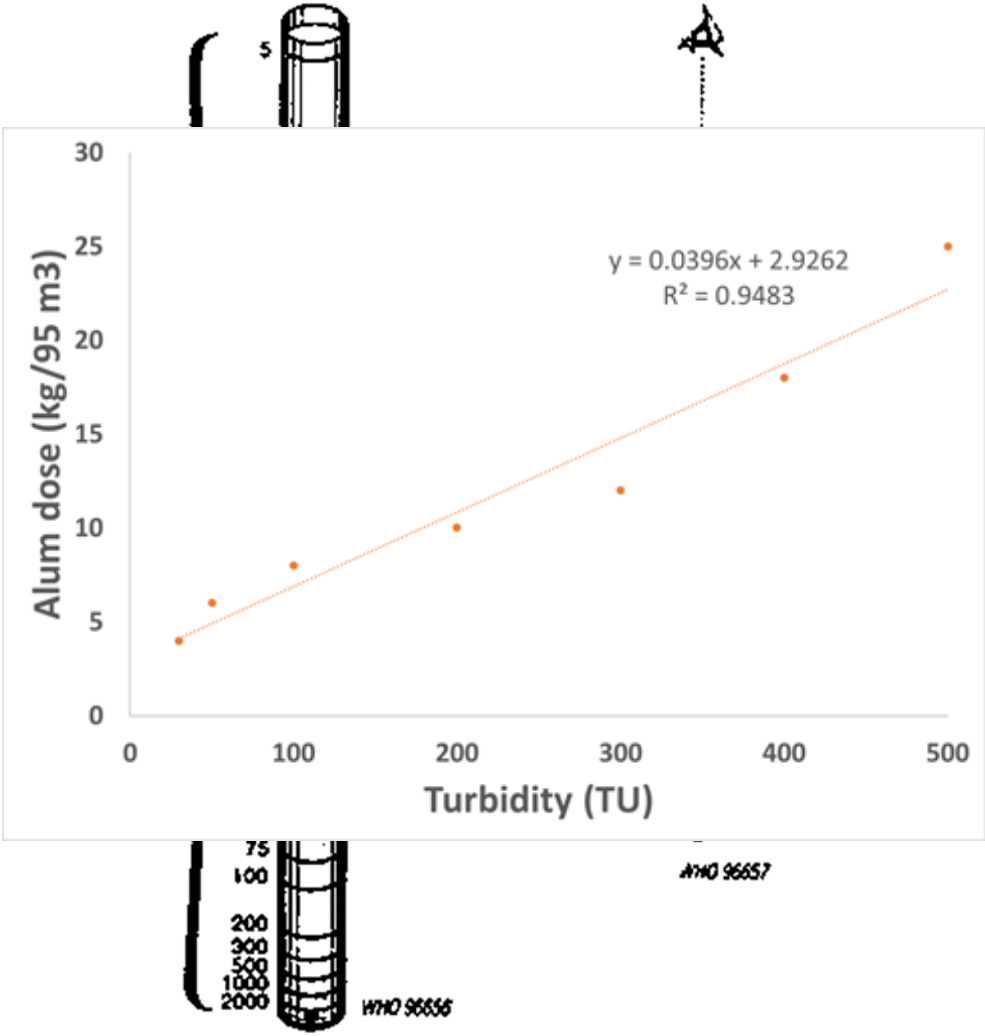
SWAT: tanks

Batch treatment: chemically-assisted sedimentation (T70 & T95)

SWAT: process control



Process control: turbidity-based alum dosing

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SWAT: alum dosing

Coagulation with rock alum

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Alum dosing

Coagulation with rock alum (little to no mixing!)

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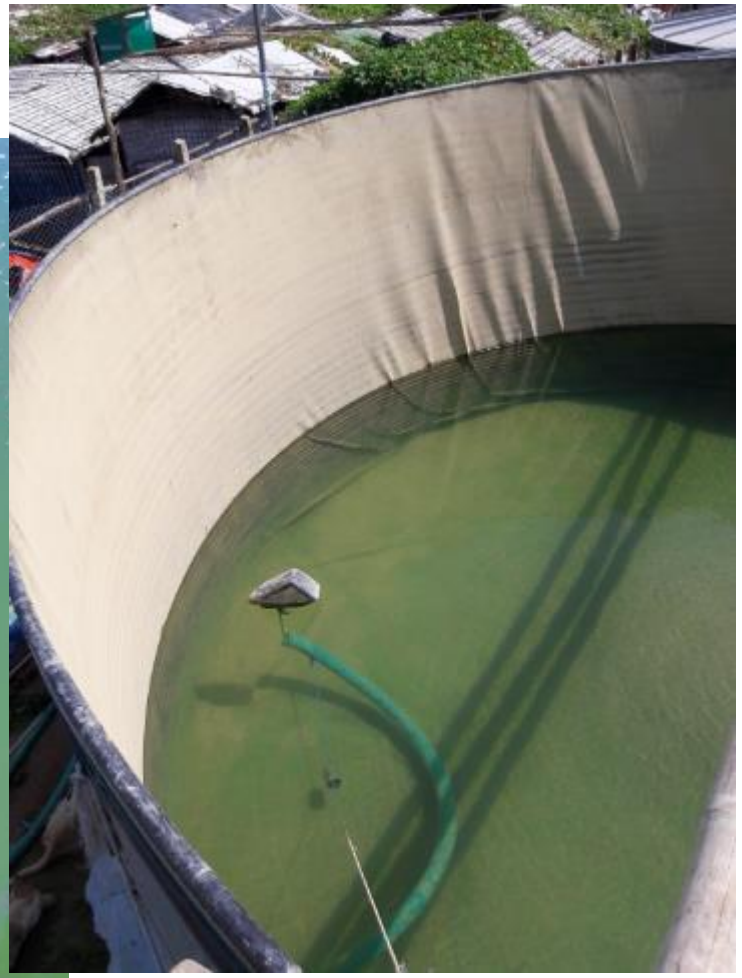
Let it settle…



Sedimentation: 5 to 9 hours

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Disinfection & distribution

Chlorination & distribution

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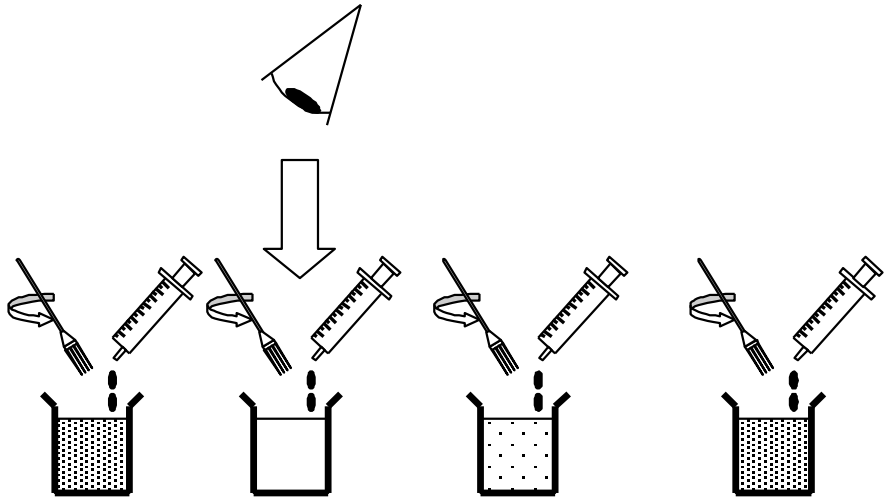
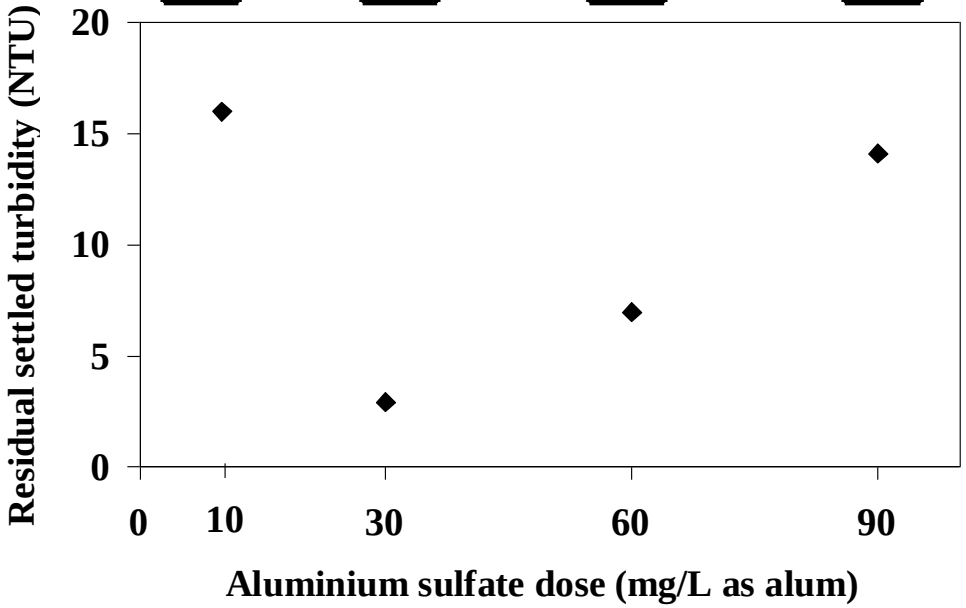
…and repeat

1. 365 days a year
2. Approximately 25000 people per camp
3. Between 350 and 500 m^3/day
4. Two shifts a day…

Troubleshooting





- **Raw water turbidity: 109 NTU;**
- **Fast mix: 30 seconds;**
- **Slow mix: 2 minutes;**
- **Optimum dose is visually estimated in the absence of a turbidimeter.**

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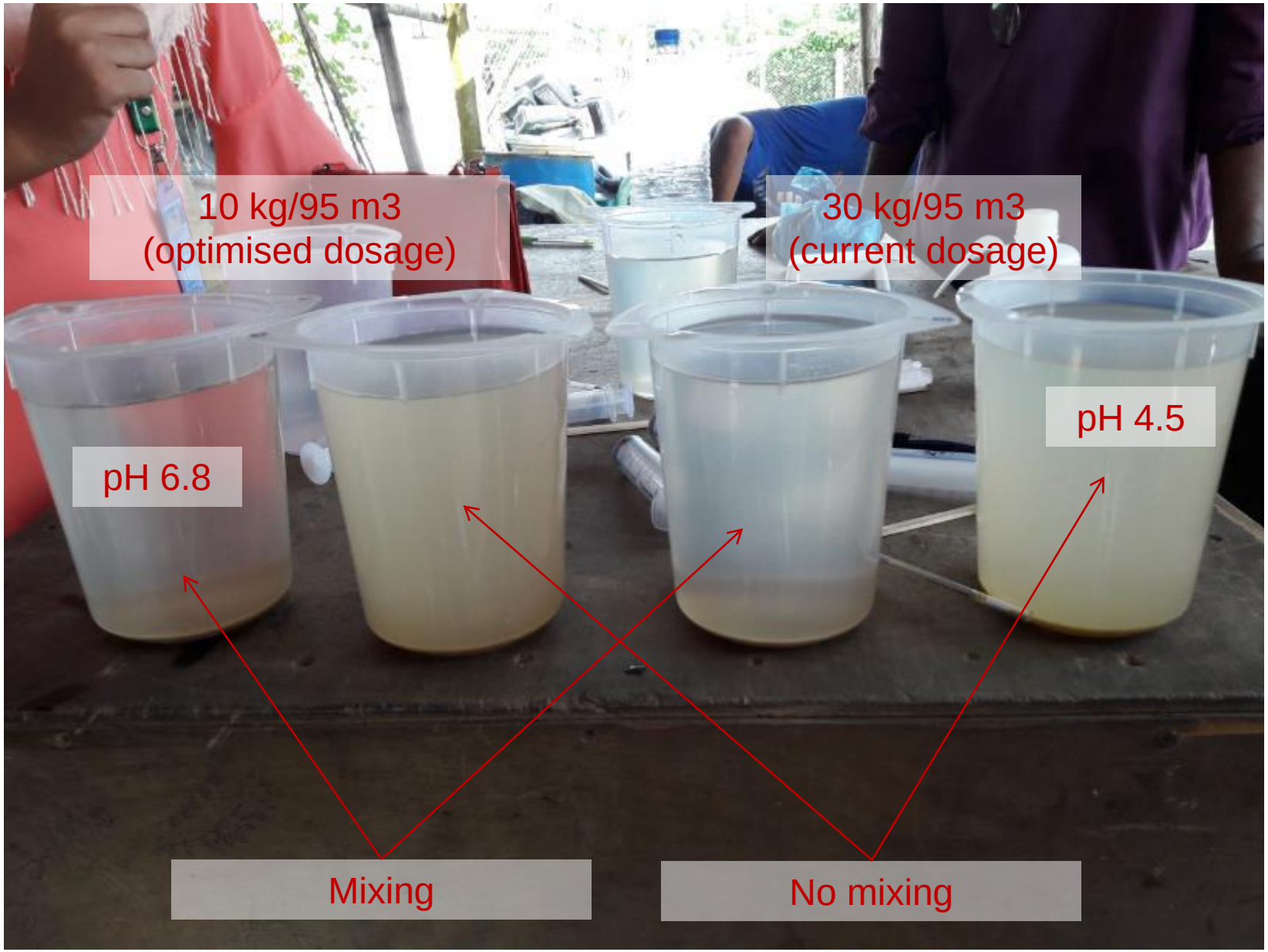
Troubleshoooting



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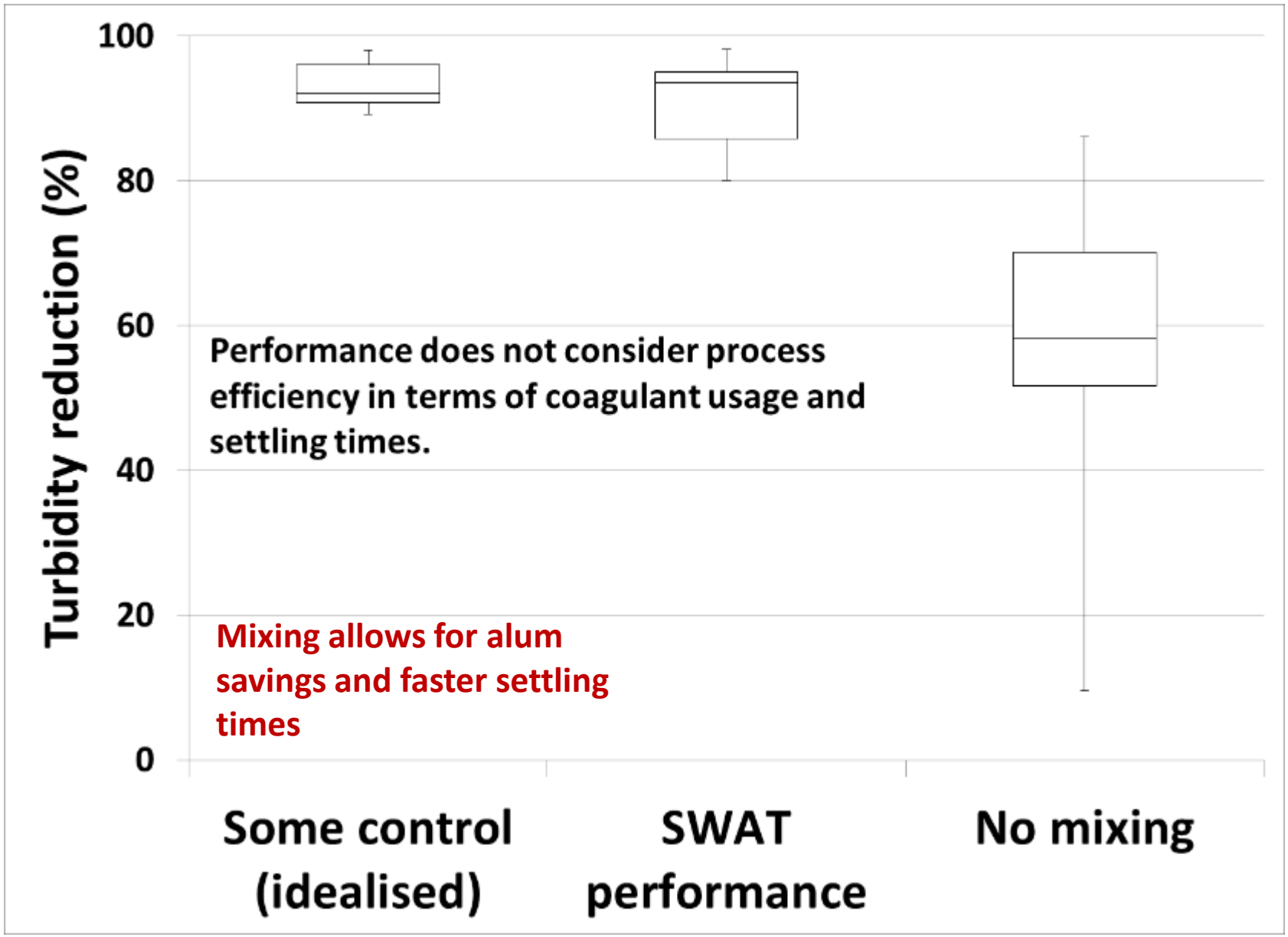
Troubleshooting



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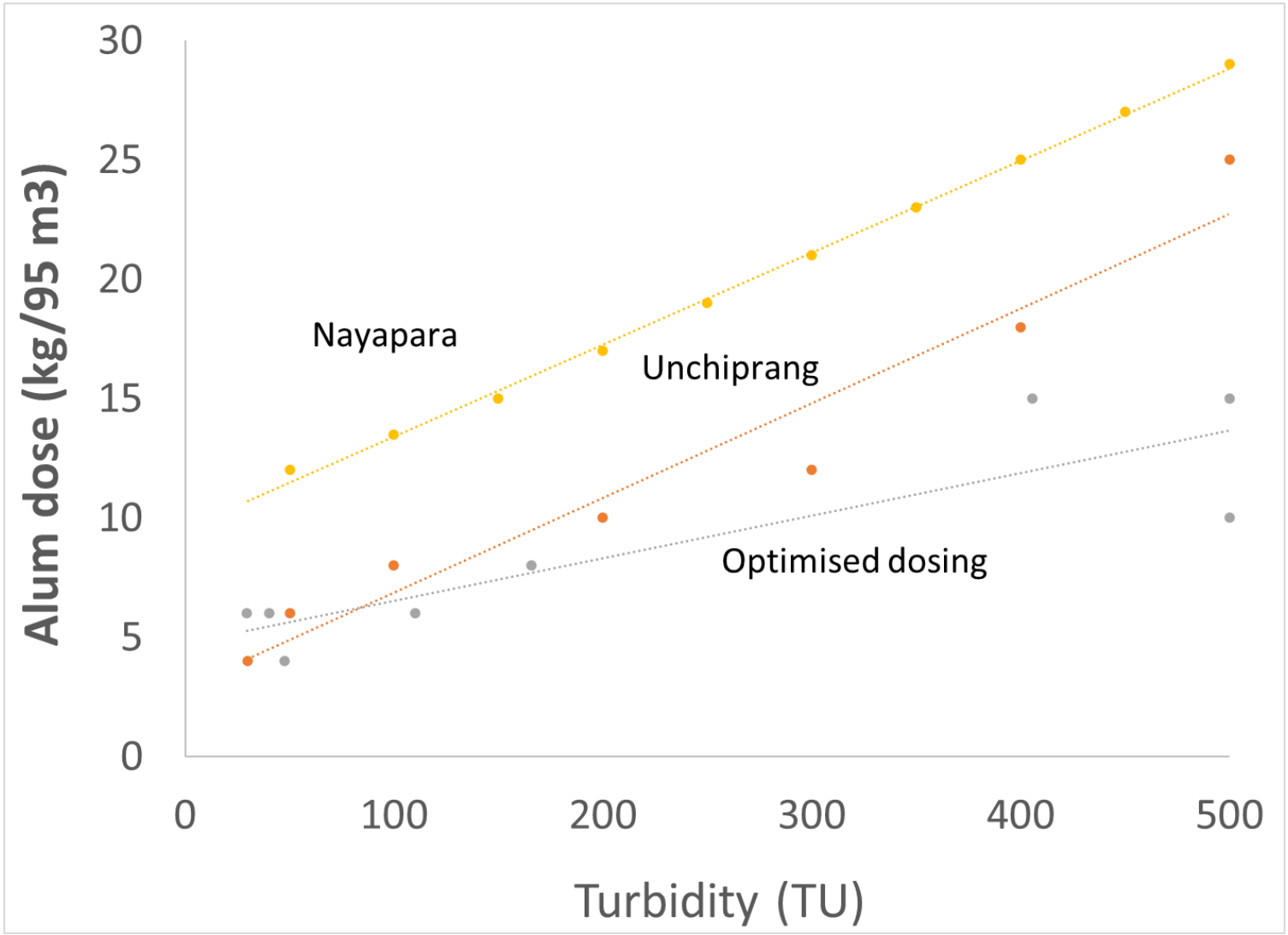
Savings



Average of 45 % savings in alum dosages
(plus better taste, no pH adjustment, etc.)

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Co-designing next solutions

1. Chlorination: hard to achieve adequate free residual levels.

2. Camps aren't going anywhere; looking at a 20 year horizon… what to do next?

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What about COVID-19?

As of 5 September, 4056 cases were confirmed in the host community (65 deaths) and 130 cases (6 deaths) in the camps

- 890,000 refugees: 40000 people/km^2 (Quebec: 2000 people/km^2)
- Lacking infra-structure
- Co-morbidities
- Information vs. misinformation
- You do the math…

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Thanks!

PH2E Lab is recruiting!
Master's & PhD positions available

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