

Could Soper's success with larviciding be recreated in Africa with a mobile app?

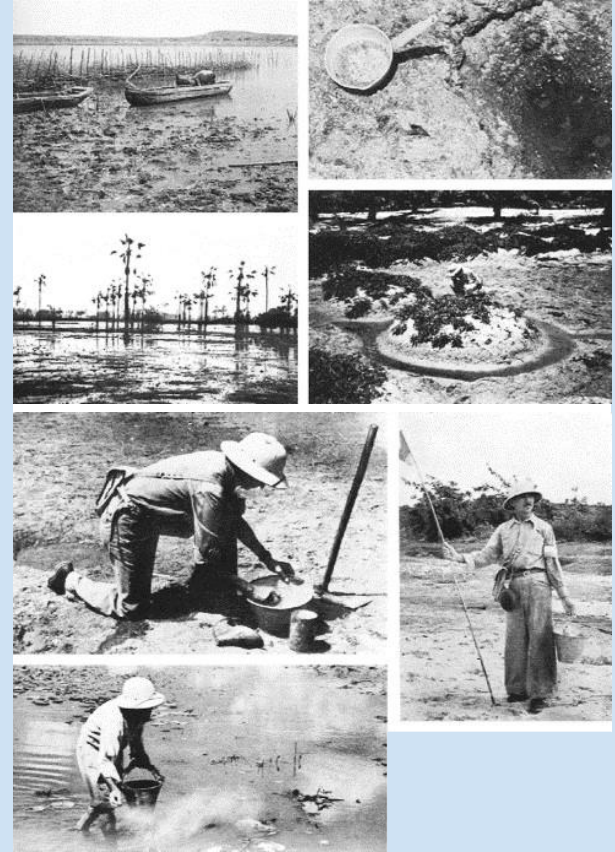


A small-scale controlled trial in Obuasi, Ghana

Ignatius Williams, Arbel Vigodny, Kwame Desewu, Arnon Hour-Yafin

Background

- ❖ 1938-1940: campaign to eliminate *Anopheles gambiae* from eastern Brazil led by Fred Soper ^[1]
 - Primary method: larviciding
 - Success within 2 years
 - Key challenges: worker management & high coverage
- ❖ 2019: use of larviciding for vector control is marginal
- ❖ Control programs and policy makers focus on adulticiding



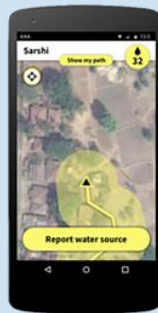
Operational challenges in large-scale larviciding

- ❖ Low coverage of water sources (Only 66.2% in Chaki et al. ^[2])
- ❖ Difficulty in returning to treated water sources for respraying
- ❖ Requires a strong surveillance system (WHO Operational Manual, 2013)
- ❖ Low cost-effectiveness in remote/rural areas (WHO position statement, 2012)

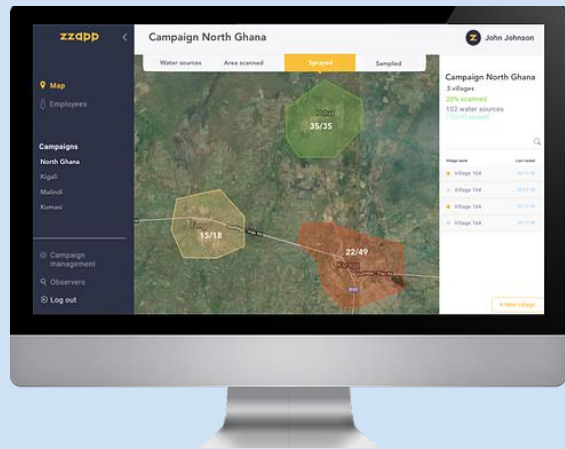
[2] Chaki, P., Govella, N., Shoo, B., Hemed, A., Tanner, M., Fillinger, U. and Killeen, G. (2009). Achieving high coverage of larval-stage mosquito surveillance: challenges for a community-based mosquito control programme in urban Dar es Salaam, Tanzania. *Malaria Journal*, 8(1).

Zzapp System: tackles larviciding operational challenges

- ❖ Mobile app - allocates tasks, guides field workers, collects and transmits data



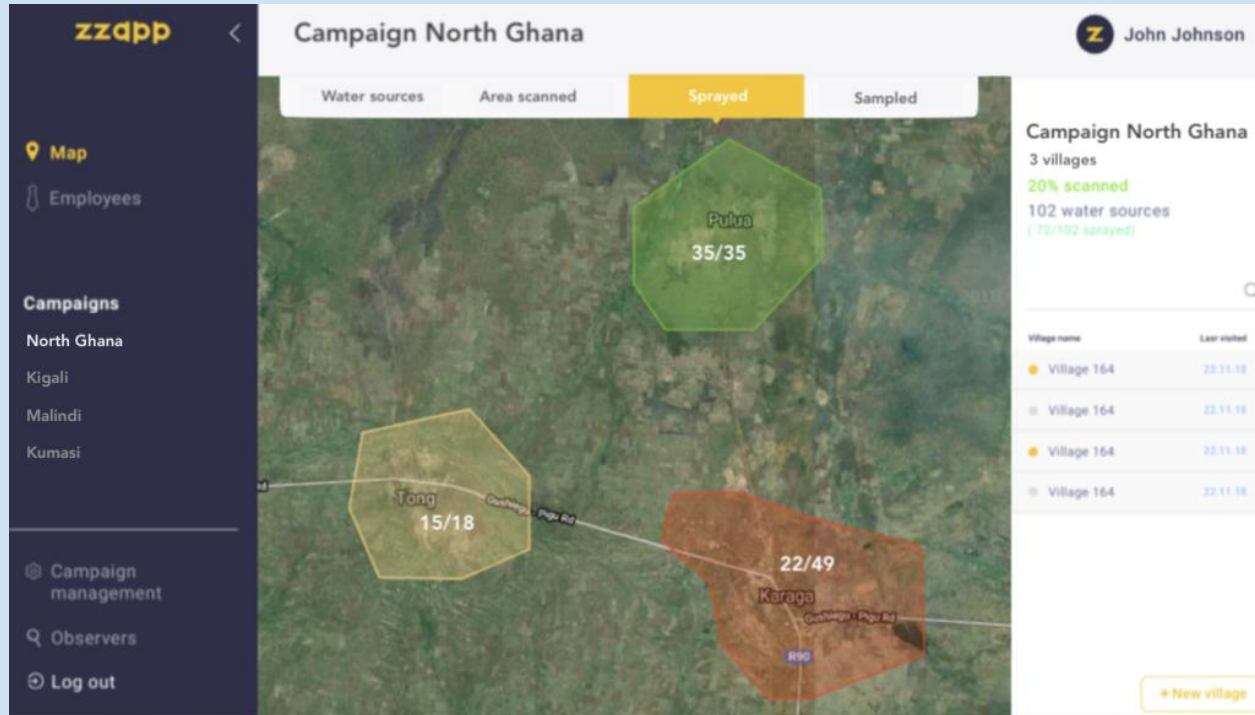
- ❖ Executive web portal - displays data to campaign managers and alerts to undertreated areas



Executive Web Portal: Planning and Costing



Executive Web Portal: Surveillance and Progress



Zoom in: water source details, including larva presence if sampled



← Chunk 123

Puddle 21

Created: 22.11.2018

Lat 39.9238409
Long 34.9238409



Visited 6 times

Last Worker
John Johnson
Phone: +57638929193
22.11.18

Team leader
John Johnson
Phone: +57638929193

 **Not found**

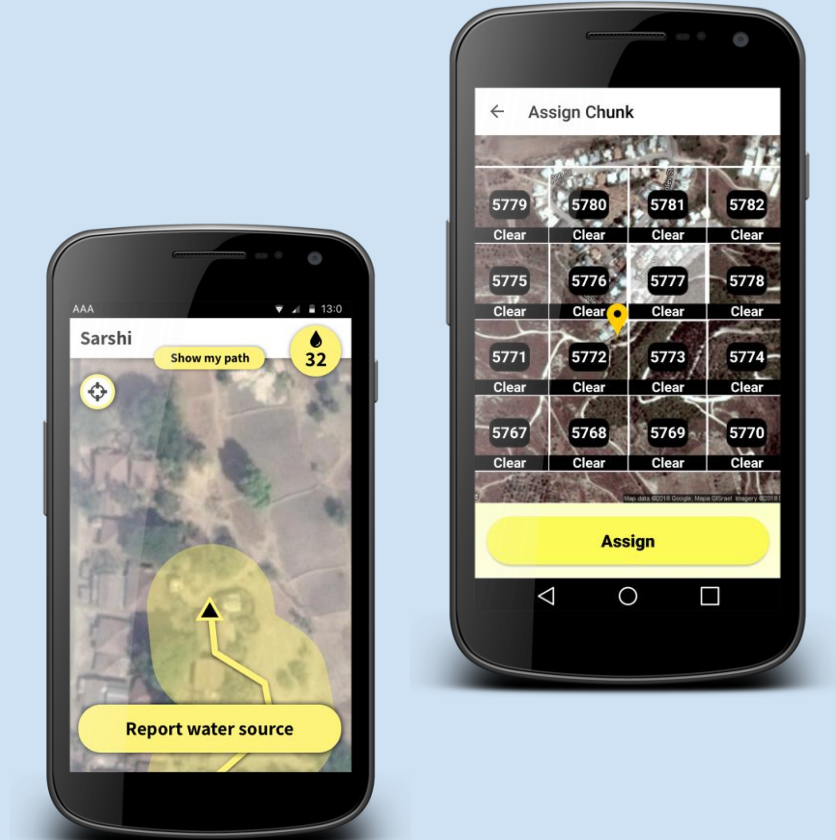
Treated 22.11.18

Sampled 28.11.18

Larva positive 16

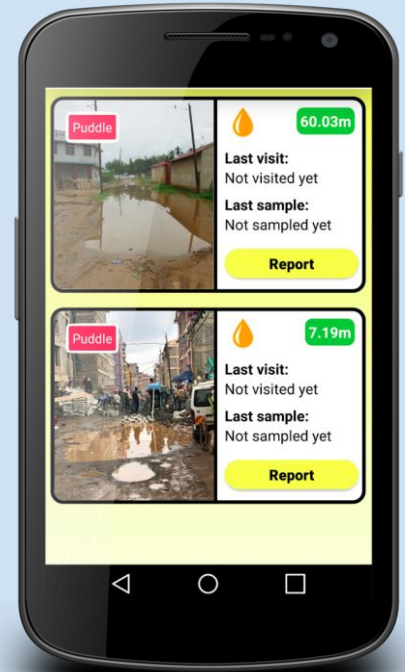
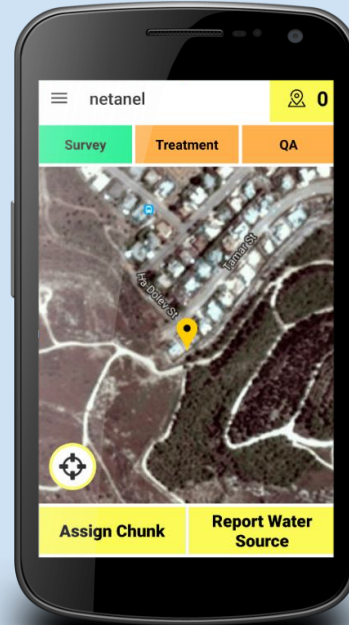
Mobile app: scanning

- ❖ Allocates small chunks of land for field workers to scan.
- ❖ Tracks workers using GPS to ensure the entire chunk is covered.
- ❖ Route is highlighted in yellow, making it clear where to scan next.
- ❖ Team leader approves or rejects the chunk based on the worker's route



Mobile app: Reporting and Spraying

- ❖ Potential larval sites are geotagged and presented on the map
- ❖ Sprayers revisit the sites at the required spraying frequency

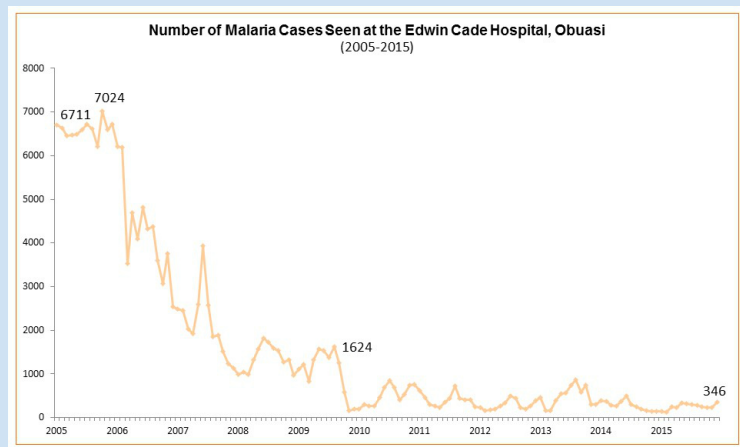


A randomized controlled trial in Obuasi, Ghana

- ❖ Mining town located in the Ashanti region
 - 175,000 residents
- ❖ AGAMal - a malaria control company, subsidiary of the AngloGold Ashanti gold mine (see: www.agamal.org)
 - Successful IRS program
 - Recently initiated larviciding



zzdpp



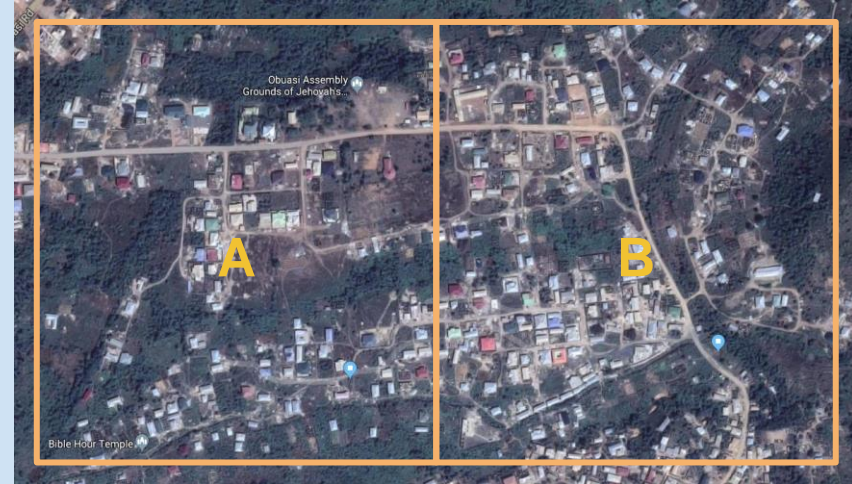
Objective

Does the mobile app increase larviciding coverage in a semi-urban setting?

- ❖ Experimental groups:
 - Scanning with the mobile app - experimental
 - Routine scanning method (managed by a team leader) - control
- ❖ Outcome variable: number of water sources reported

Method

- ❖ Participants: 10 spraying workers from AGAMal
 - Randomly divided into two groups
- ❖ Scanning area: 1,200m x 600m
- ❖ Procedure:
 - Day 1: group 1 area A, group 2 area B
 - Day 2: group 1 area B, group 2 area A



Results

	Control group	Mobile app group
Total reports	147	87
Duplicate reports	75	5
Erroneous reports	2	0
Outside bounds	6	0
Total valid sites	64	82

Guided by the mobile app, workers detected 28% more water sources.



Future studies

- ❖ Implementation in a large-scale larviciding operation
- ❖ Assess impact on Anopheles and malaria reduction
- ❖ Larviciding following case detection
- ❖ Spatial Intelligence System (SIS)
 - Integration with drones and satellites
 - To be tested soon in Zanzibar
 - Funded by IVCC

Thank you!

