Insights from Digitalizing LSM

Opportunities in Urban Larval Source Management

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Bottom-Line, Up Front

- Malaria focused LSM operations can have beneficial effects on non-Anopheles mosquito reduction
- By digitalizing LSM activities, we can identify significant opportunities to reduce costs of LSM operations
    - **For Mombasa, this looks like a healthier, greener, cleaner city!**
- Opportunities to collaborate between MOH, other government departments departments and private entities

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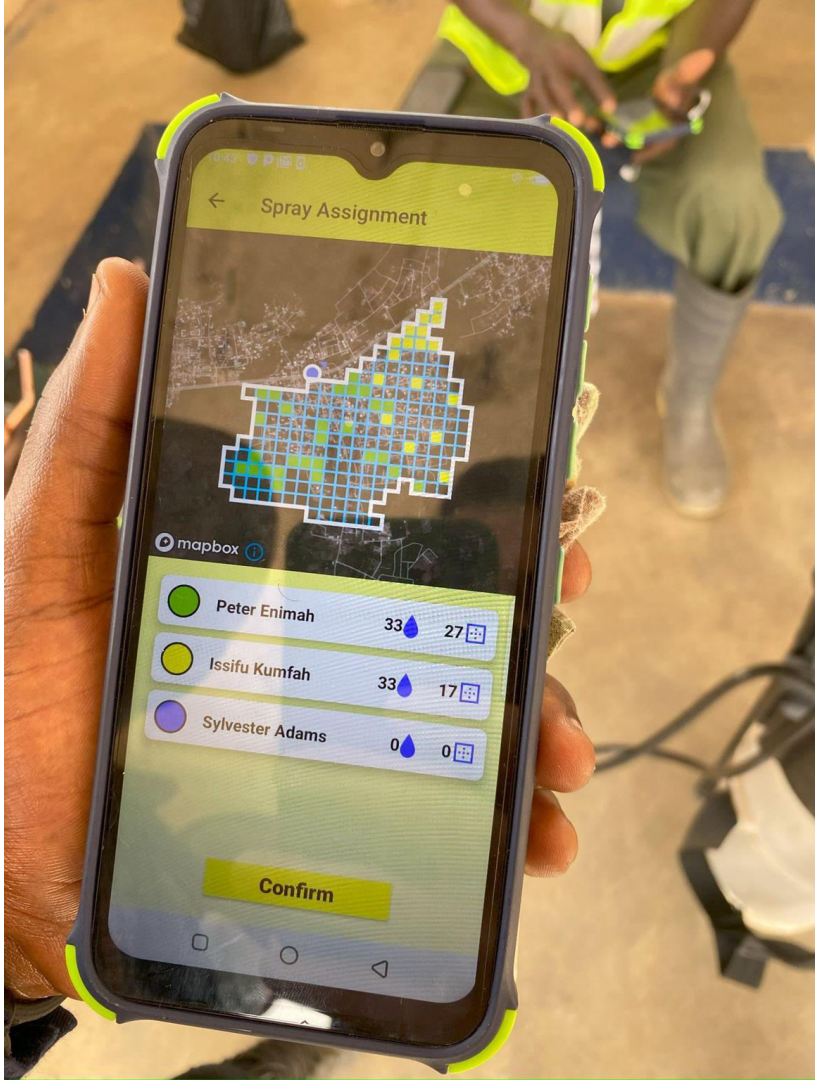
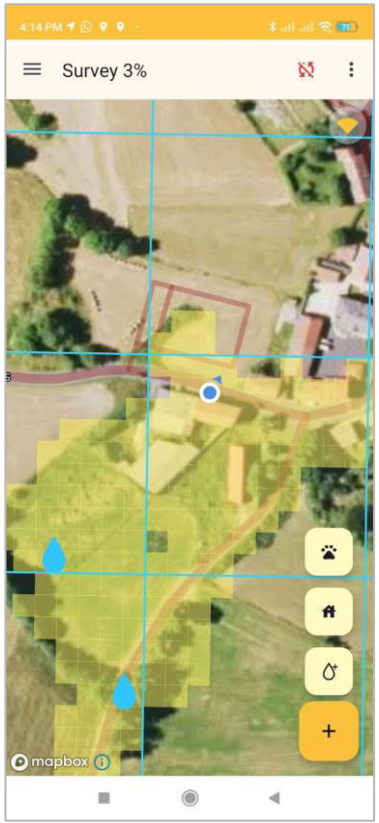
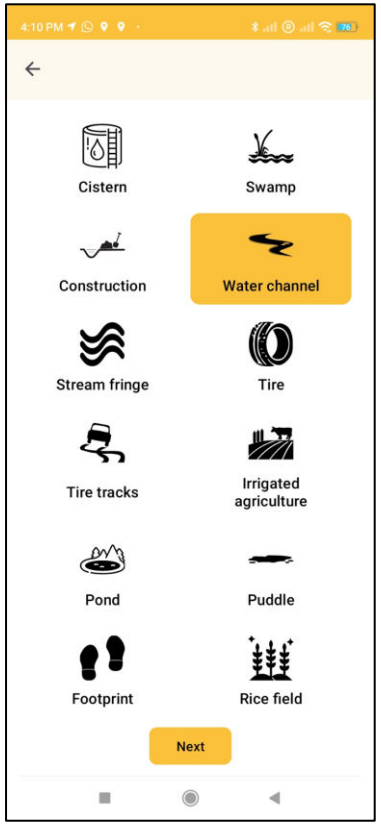
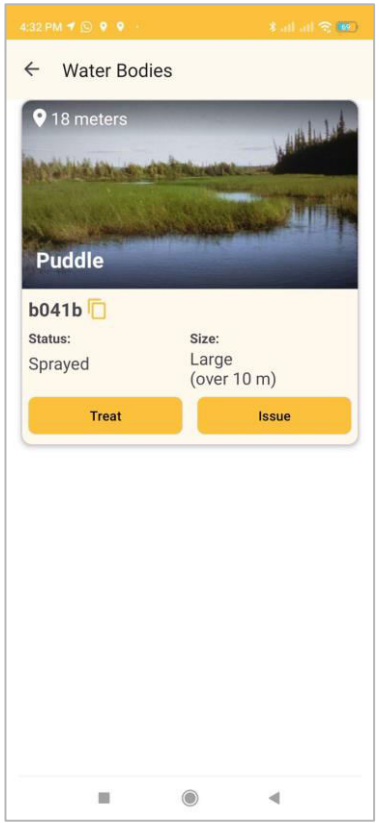
Deploying AI to combat malaria

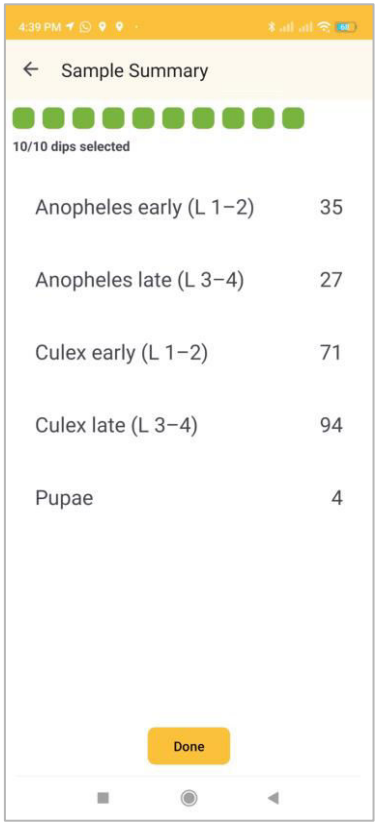


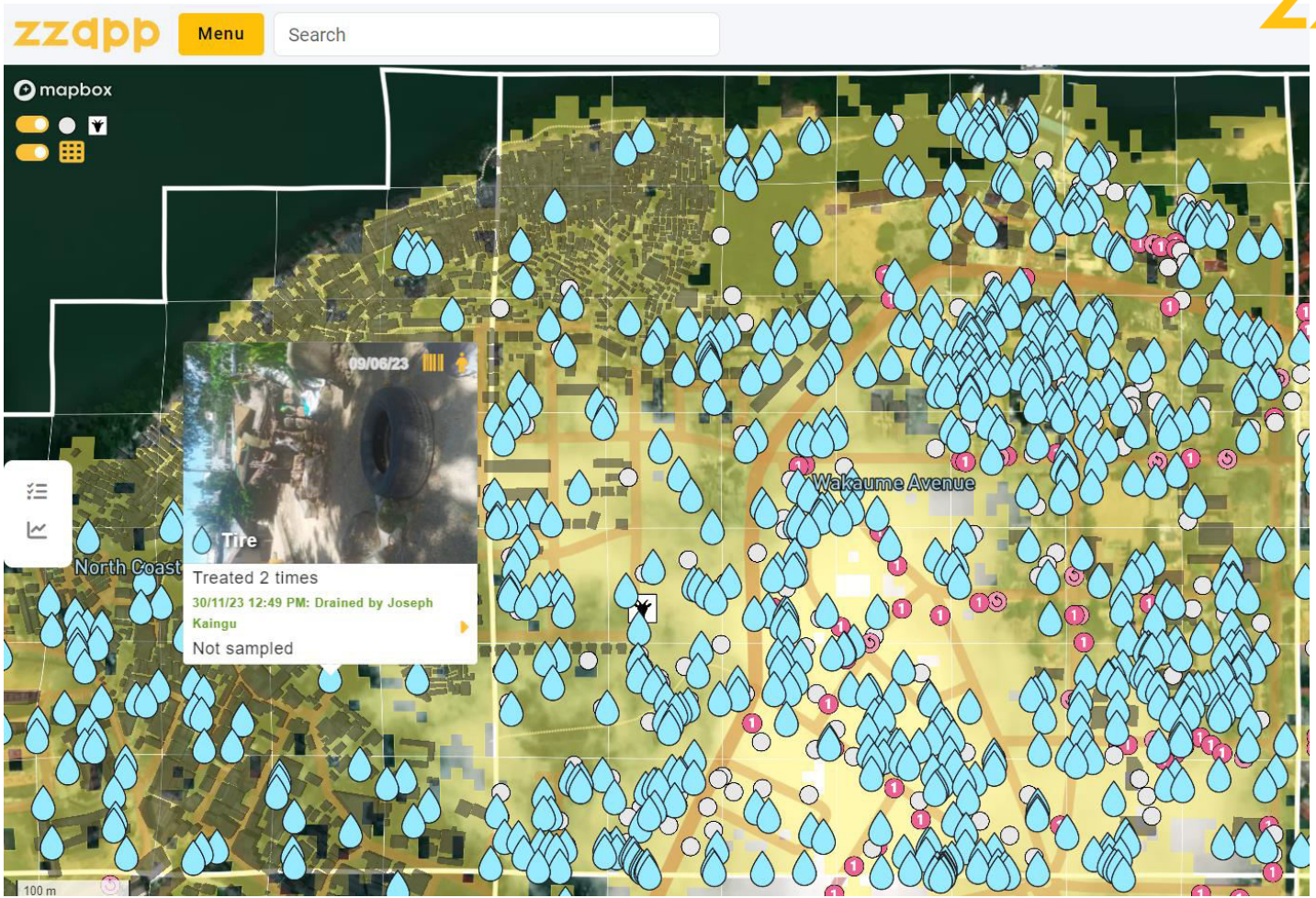
Mobile App: Water Body Mapping & Reporting







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Menu
Search
mapbox
09/06/23
Tire
Treated 2 times
30/11/23 12:49 PM: Drained by Joseph Kaingu
Not sampled
Wakaume Avenue
North Coast
100 m

Larval Source Management Pilot, Mombasa Island

Area:
Intervention: 14.1 km^2
Control: 4.4 km^2

Period:
Initial Mapping: May - Jun
Larvicide: Jun - Aug
Monitoring & Evaluation: May-Nov

Staffing:

- CHWs: 200
- MOH: 8 Vector Control & 2 Entomology
- ZzappMalaria: 1 Project Manager
- KEMRI: 1 entomologist (as needed)

Larvicide: Aquatain AMF

- Application rate 1mL / m^2
- Treatment every 20 days

Operational Results

- Mapped >82% sub-county
- **Identified 6,752 water bodies**
  - 472 water body / km^2
- Sampling
  - 8,582 larval samples
  - 1,879 adult trap-nights
- Treatment:
  - 3 rounds of larvicide
  - 33% of water bodies “dried out” during dry season

Adult Mosquito Trapping

Trapping Operations:

- Intervention: 761 trap-nights
- Control: 718 trap-nights

Key Takeaways:

- LSM effectiveness across all mosquitoes, not only *An.*
- “Floor effect” for the *Anopheles*

Anopheles Trap-Night Average	Before	After	Reduction
Intervention	0.08	0	100%
Control	0.06	0	100%
Impact			**NA**

Aedes Trap-Night Average	Before	After	Reduction
Intervention	0.90	0.15	63.3%
Control	0.49	0.34	30.6%
Impact			**75.9%**

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Larval Sampling

Sampling Operations

- Intervention: 1,798 samples
- Control: 1,137 samples

Key Takeaways:

- LSM effectiveness across all larvae, not only *An.*
- **No** *An. Stephensi* larvae identified

Anopheles Water Body Positivity (%)	Before	After	Reduction
Intervention	1.9%	0.05%	97.3%
Control	6.0%	0.3%	95.0%
Impact			**47.37%**

Non-Anopheles Water Body Positivity (%)	Before	After	Reduction
Intervention	66.0%	10.9%	83.4%
Control	46.4%	17.4%	62.5%
Impact			**55.96%**

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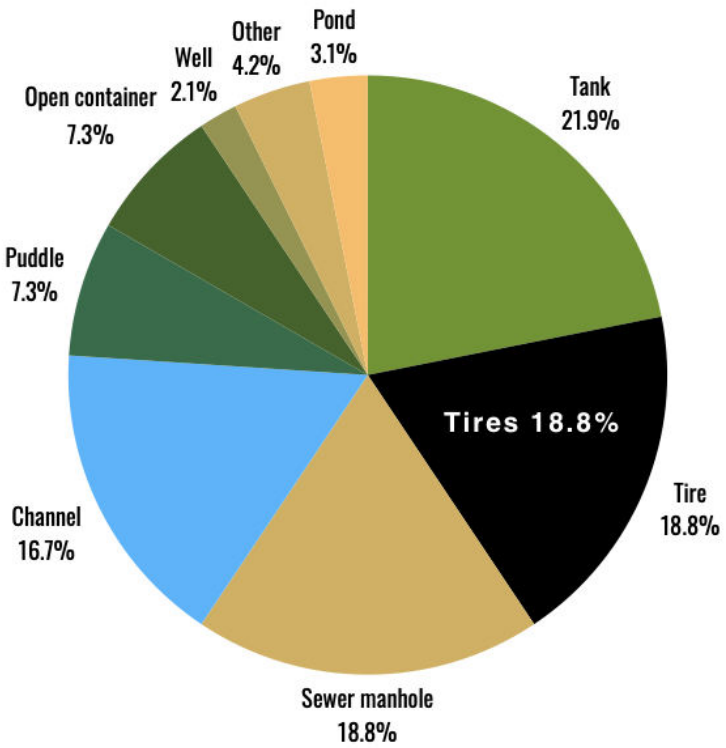
Water bodies by Type



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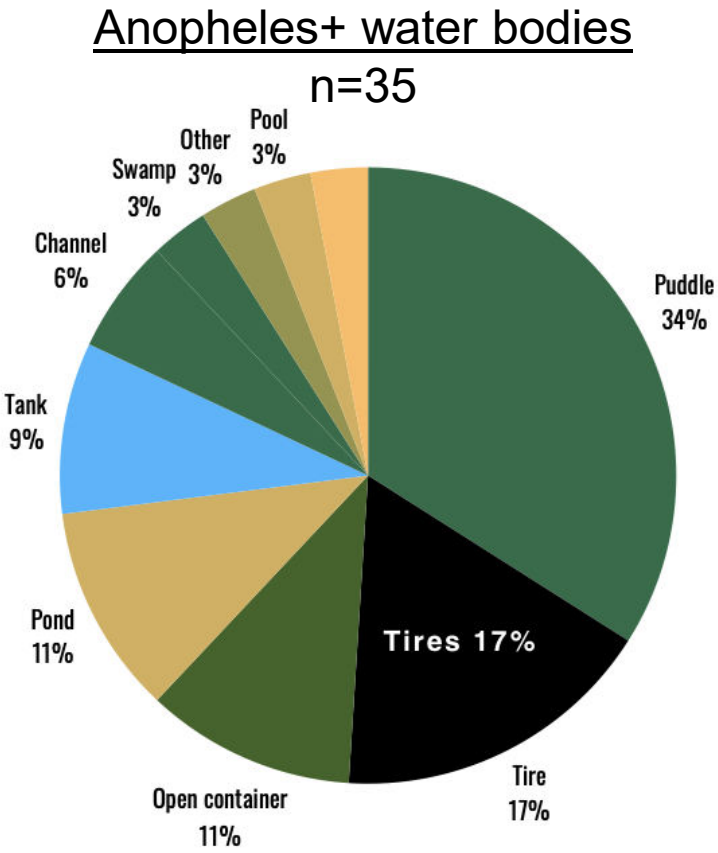
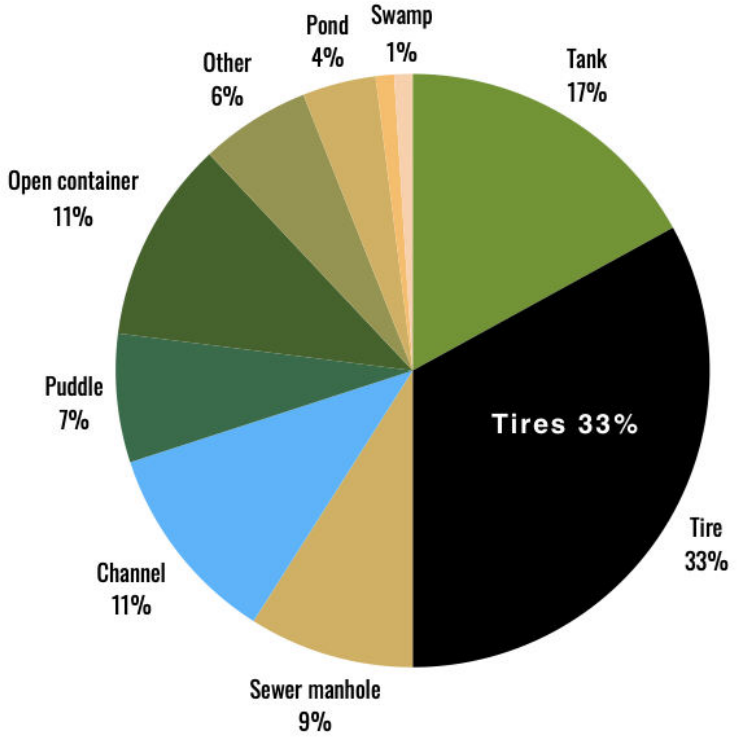
Anopheles Larval positivity by Water Body type



Non-anopheles Larval positivity by Water Body type

Non-Anopheles+ water bodies

n= 1,481



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Tire Aggregation Opportunity

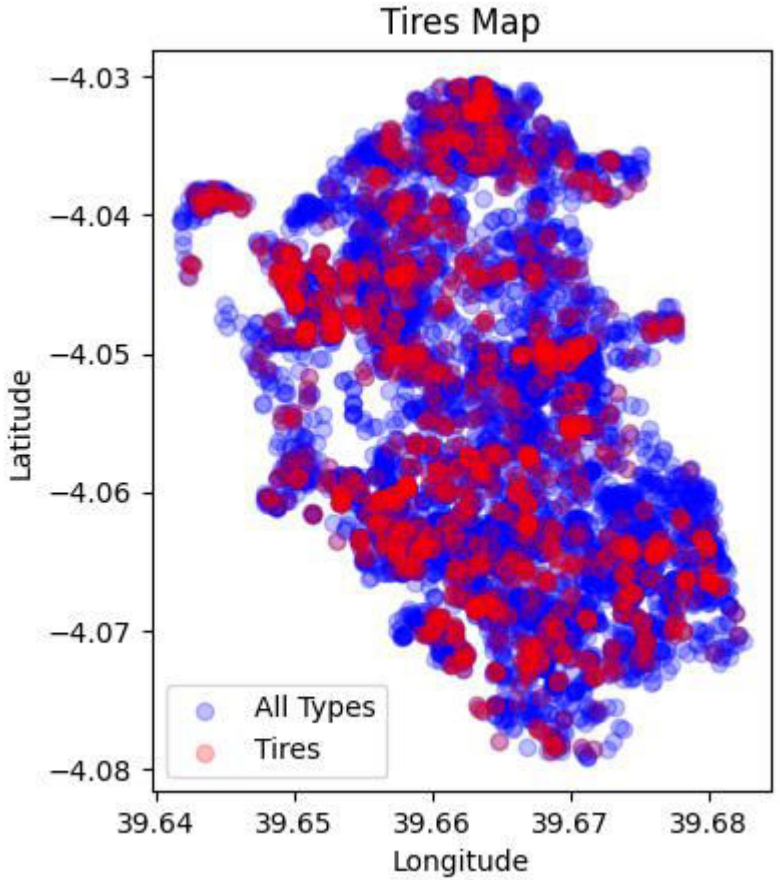
Discarded tires

- 17% *An+* water bodies
- 33% positive non-An+ water bodies

Key Players:

- Mombasa Ministry of Health
- Bamburi Cement
- Local Communities

Permanently removed over 3,000 high-risk water bodies, for good



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Tires Collection Operation

- 3,280 tires collected (~40-60%)
- 6 staff, 2 vehicles
- 25 work days

Comparison, 5 Year LSM Operation

	Larviciding	Tire Removal
Total Cost	$528,000	$5,850
Cost / WB	$78.22	$2.78

Opportunities

- Malaria focused LSM operations can have beneficial effects on non-Anopheles mosquito reduction
- By digitalizing LSM activities, data visualization can help identify significant opportunities to reduce costs of malaria control efforts
    - **For Mombasa, this means a healthier, greener, cleaner city!**
- Collaboration between different government departments and private entities are possible, if profitable

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Acknowledgements

Thanks to all the partners, fieldworkers, community leaders and members who made this operation possible!

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