

Health risk associated with plastic debris on the Island of Zanzibar

– Importance of associated pathogenic bacteria and implications for local communities

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Publication date:
2018

Document Version
Other version

Citation for published version (APA):

Syberg, K., Buur, L., Jelsbak, L., & Simonsen, L. (2018). Health risk associated with plastic debris on the Island of Zanzibar: – Importance of associated pathogenic bacteria and implications for local communities. Abstract from Transforming for Sustainability, Copenhagen, Denmark.

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Health risk associated with plastic debris on the Island of Zanzibar

– Importance of associated pathogenic bacteria and implications for local communities

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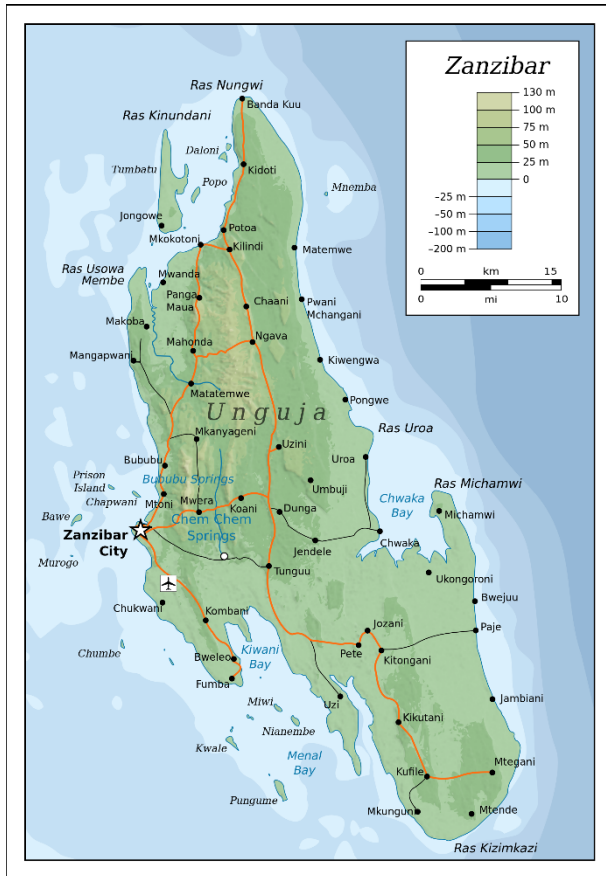
Roskilde University

Overview of presentation

- Scope for the project
- Introduction to Zanzibar, cholera and plastic pollution
- Preliminary study
- Future perspectives



Zanzibar, cholera and plastic pollution



Zanzibar:
Population:
Tourists:

Unjuga and Pemba
1.3 million
376,000 in 2016/2017

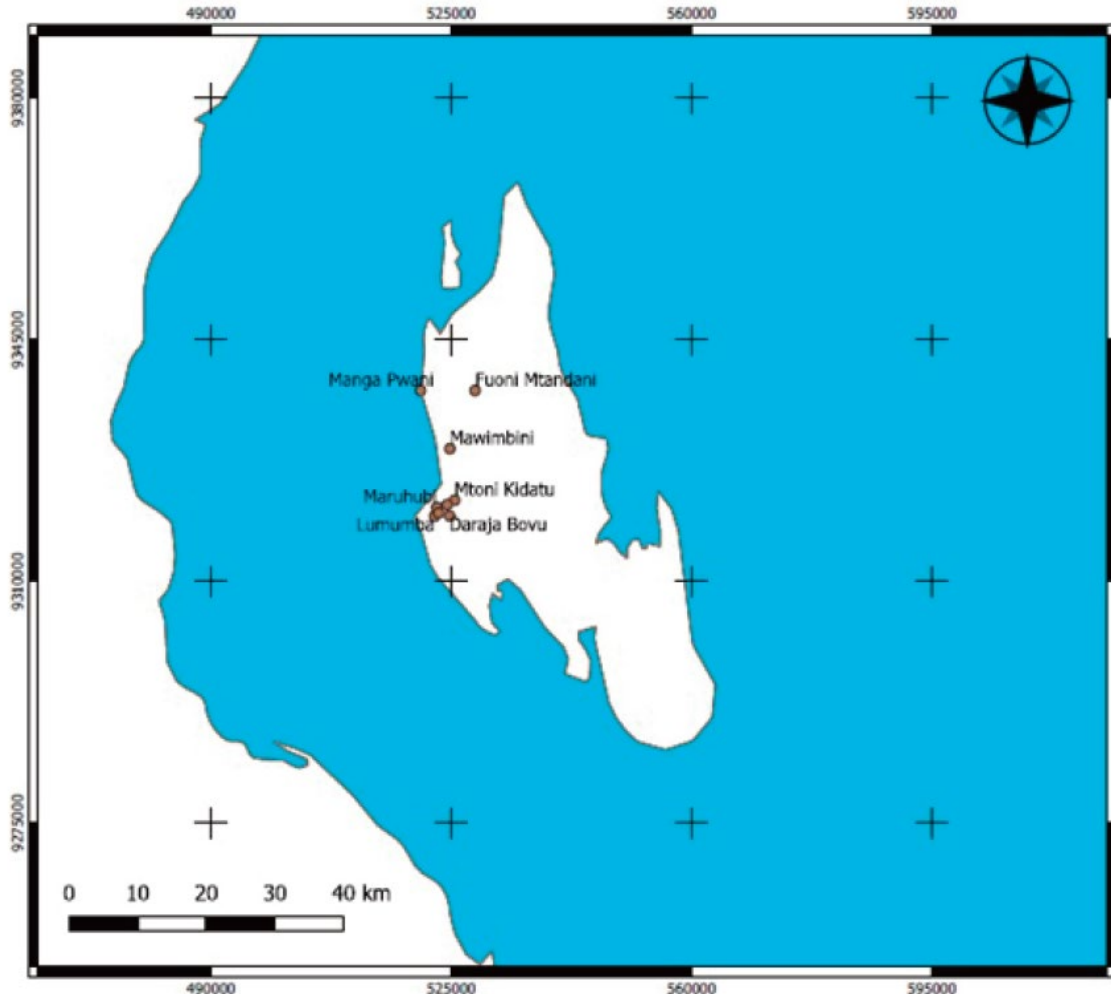
Plastic waste:
Waste handling:

Almost all waste is deposited on dumping sites
69 official and 92 unofficial dumping sites

Cholera - reported:
Cholera - unreported:

3000 in 2016 (mortality: 51)
Everything below 10/clinic/week

Preliminary study in fall 2018



We spend three days on Zanzibar in early fall 2018. Sampling plastic debris and building a local network

Before that:

Our local contact identified the most relevant sites on the Island

Relevance based on:

1. Area known for Cholera
2. Identified plastic litter

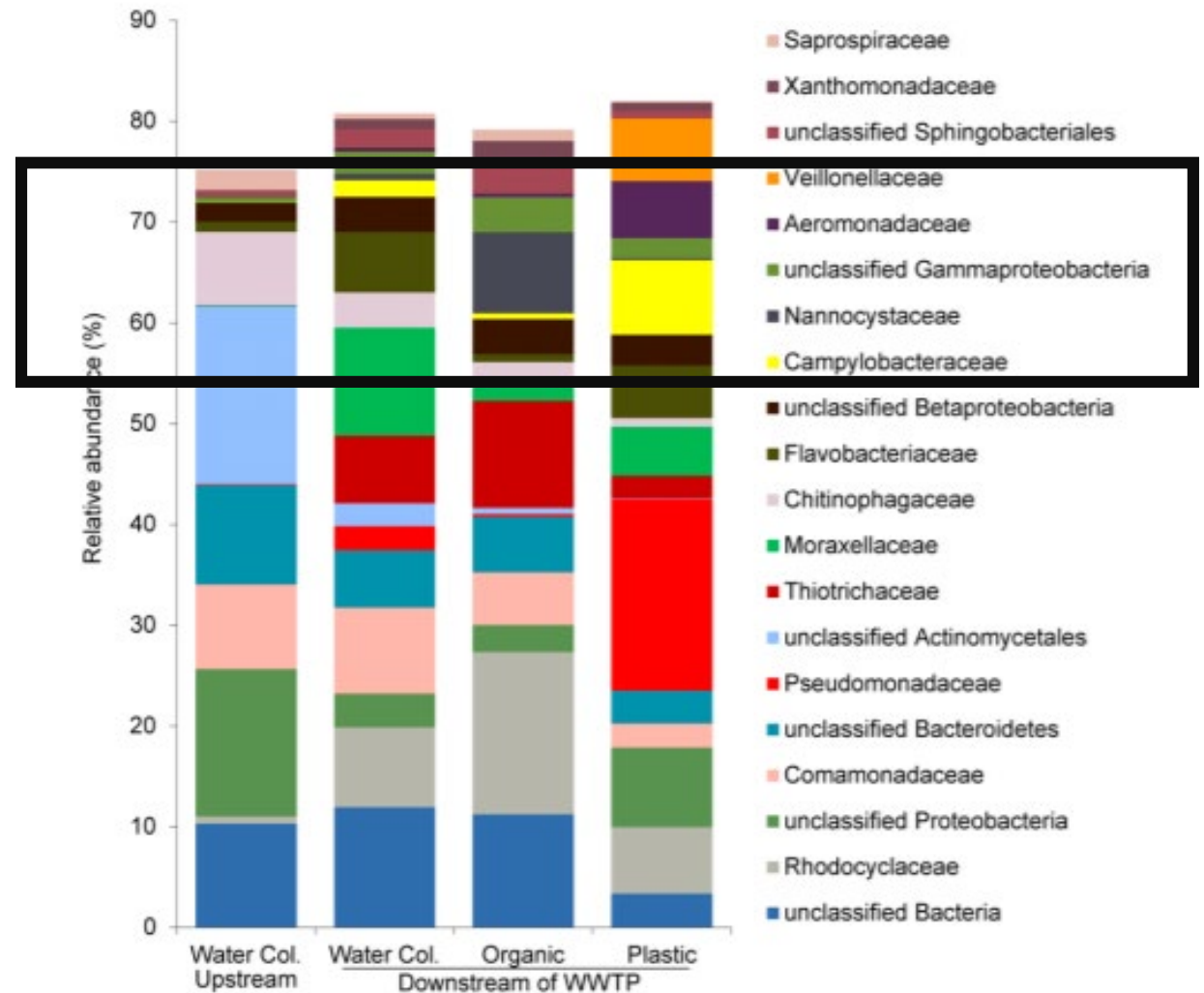
Plastic pollution on the Island

Waste on locations known to be epicenters for spreading of cholera



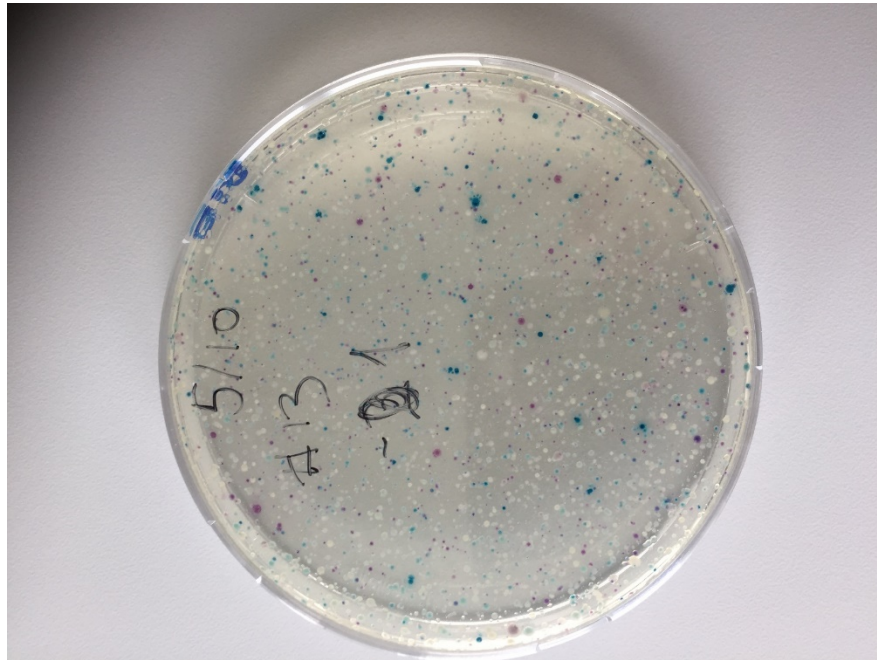
Plastic and pathogens

- McCormick *et al.* 2014 found a distinct variety of bacteria on plastic from a WWTP
- Pathogens such as *Campylobacteraceae* (Yellow) were found at higher concentration on plastic

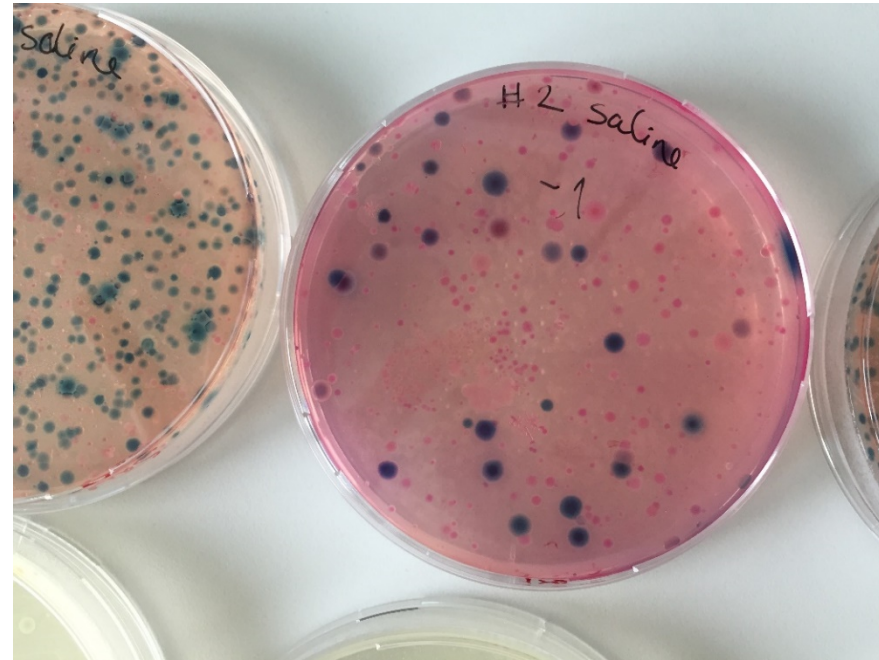


Pathogens on our samples

Bacteria isolated from plastic debris were plated on selective media to identify *Salmonella* and *Vibrio* species.



Vibrio cholera (purple)
Found on: 65% of samples



Salmonella/ *E. coli* (pink/blue)
Found on: 100% of samples

Link between plastic waste and human health?

- Plastic bottles are used when selling juice
- They are picked up from waste
- Many of these NOT cleaned properly



Our future perspectives

- We wish to make a larger project with the following aims:
- Assess to what extent pathogens (*Vibrio cholerae* + other relevant bacteria) are associated with plastic debris on the island of Zanzibar and mainland Tanzania
- Assess the likely health risk associated with collecting and handling the plastic debris
- Analyze how local communities and government deal with plastic and cholera, in order to avoid the identified risks
- Provide recommendations to local communities and the government authorities on how to address the risk in a sustainable manner



Special thanks to

Rikke Guttesen

Anne Busk Faaborg

Siajali Pamba

Vonica Perold

Rasmus Pedersen

Nicodemus M. Minde

Mohammed Maalim



Thank you for your attention

Any questions?