

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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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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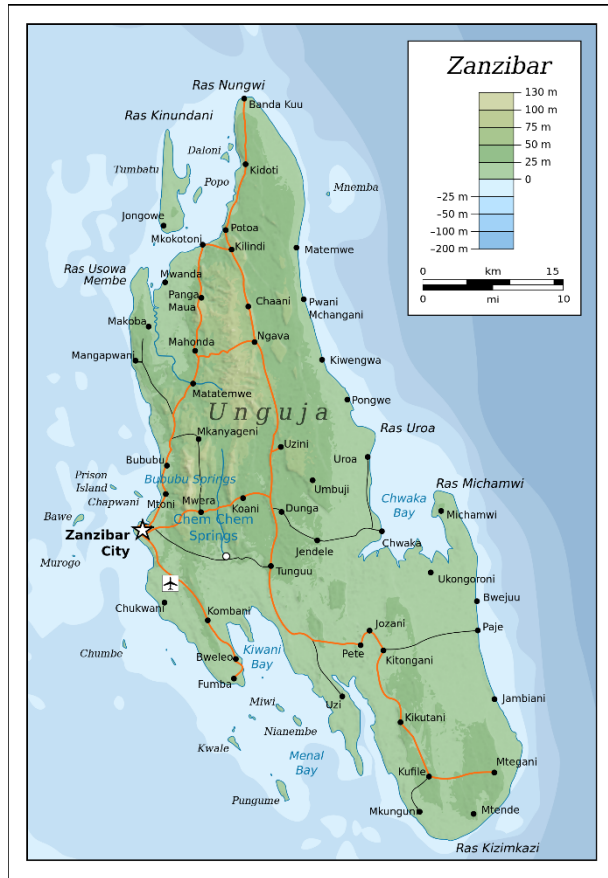
Roskilde University

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

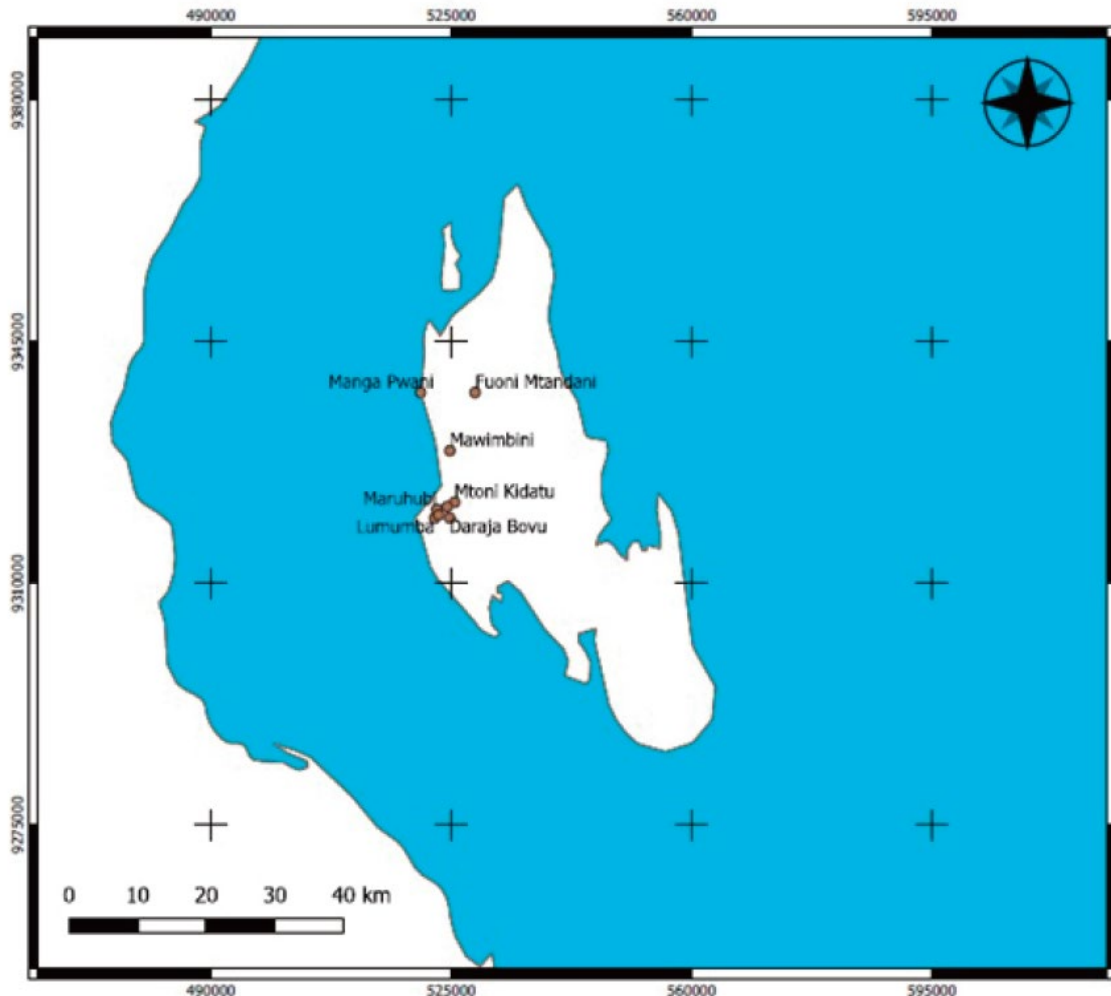
Plastic waste:
Waste handling:

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

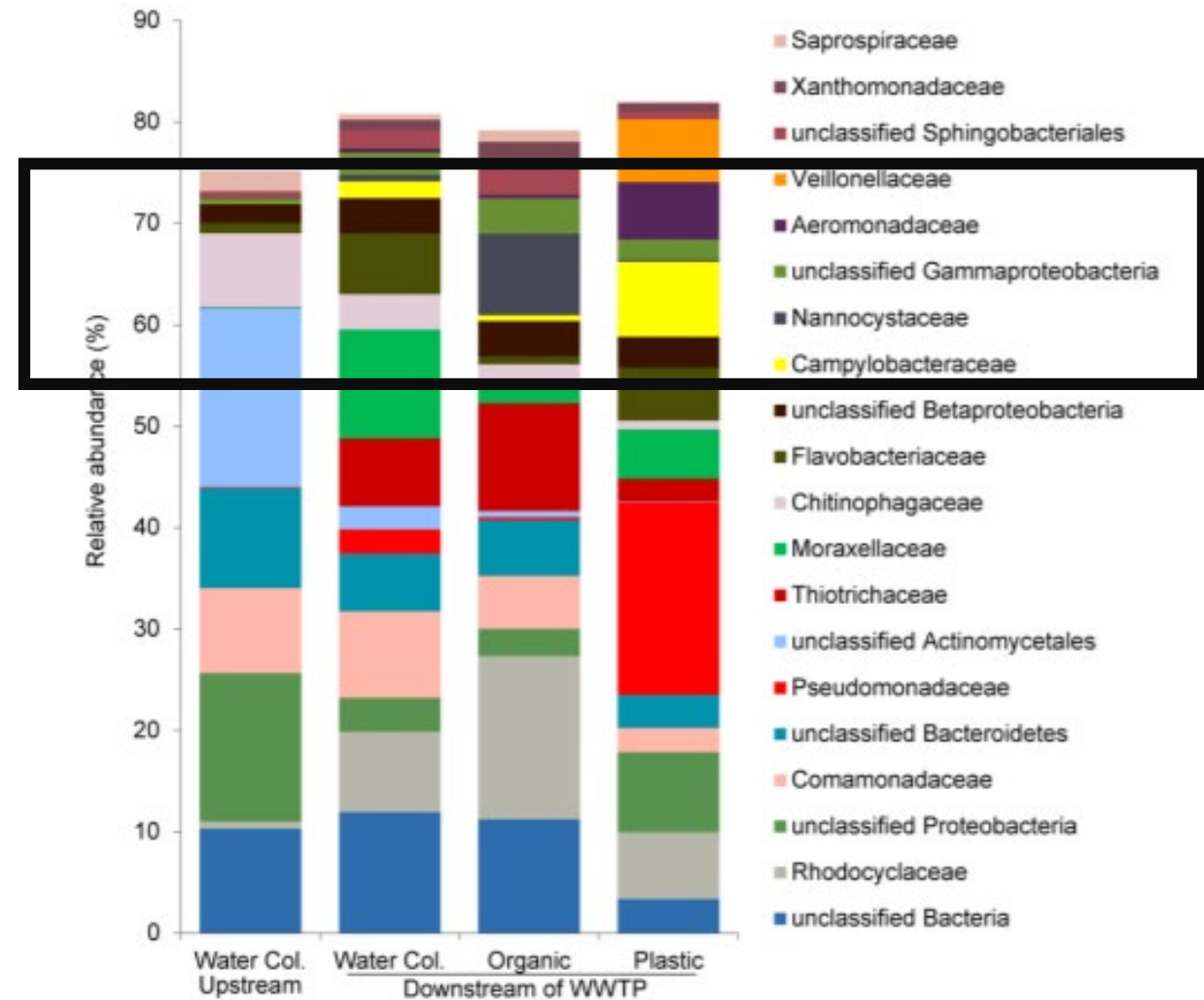
Plastic pollution on the Island

Waste on locations known to be epicenters for spreading of cholera



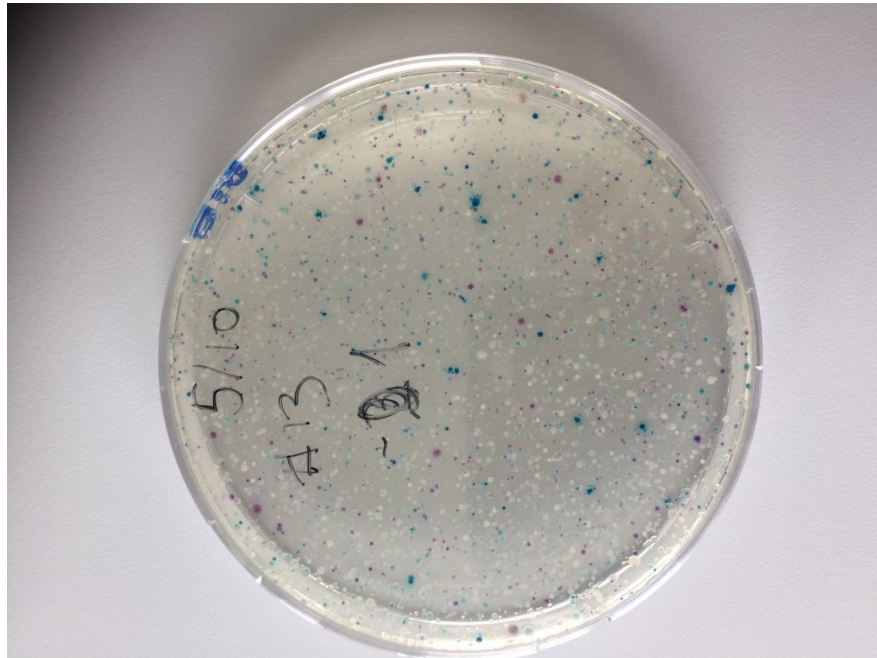
Plastic and pathogens

- 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

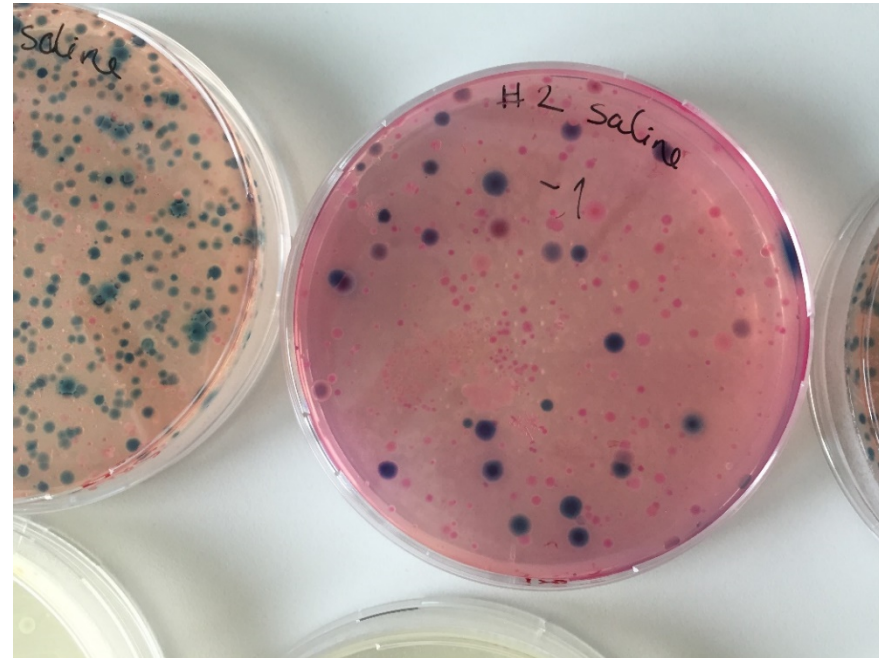


Pathogens on our samples

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



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Thank you for your attention

Any questions?