

# **SUSFISH**

## **Sustainable Management of Water and Fish Resources in Burkina Faso**

Human impacts on the fisheries management in Burkina Faso

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supervised by Dr. A. Melcher

IHG – Institute of Hydrobiology and Aquatic Ecosystem Management, WAU – Department of Water, Atmosphere and Environment, BOKU



## Introduction

- Are fish communities influenced by human pressures?
- Define human pressures in Burkina Faso
- Assess human pressures
- Select representative sites
- Find a method for weight estimation
- Find sensitive fish species/genera

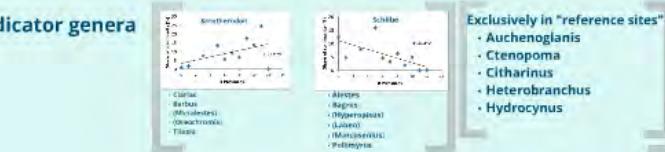
## Methods



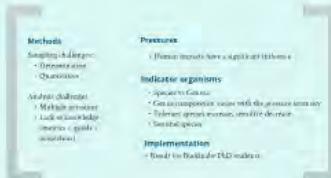
## Results so far



## Possible indicator genera



## Discussion



# Introduction

- Are fish communities influenced by human pressures?
- Define human pressures in Burkina Faso
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# Methods

## Data

- Own
- Fishbase
- Raymond



Fish data  
Pressures  
Landuse  
Sampling methods  
Physicochemical parameters

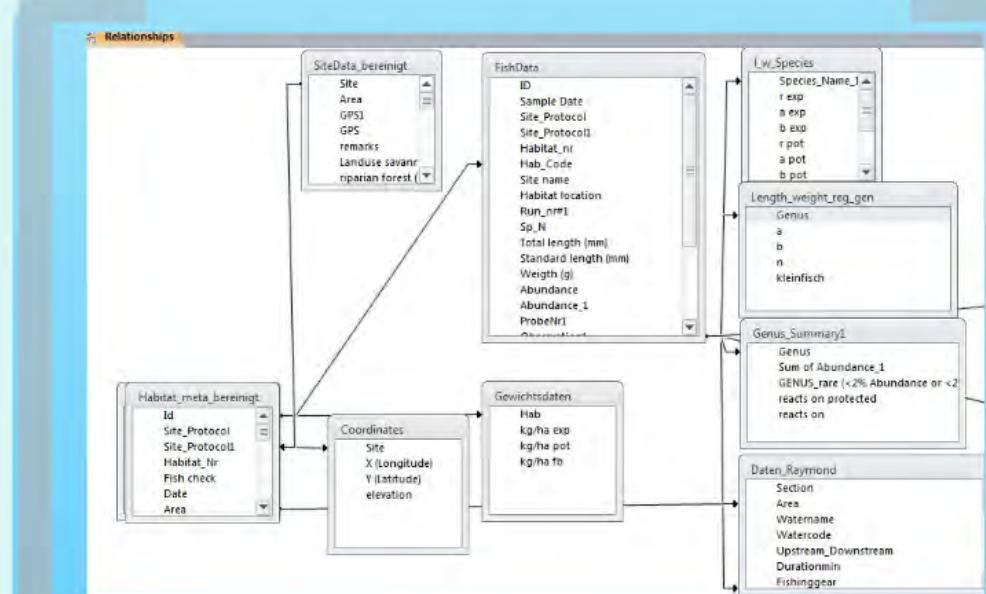
A screenshot of a Microsoft Access database table titled 'Environmental Data'. The table has columns for 'ID', 'Location', 'Parameter', 'Value', and 'Date'. Several rows of data are visible, including entries for 'Salinity', 'pH', 'Temperature', and 'Dissolved Oxygen' at various locations like 'Site A', 'Site B', and 'Site C' on specific dates.

## Data analysis

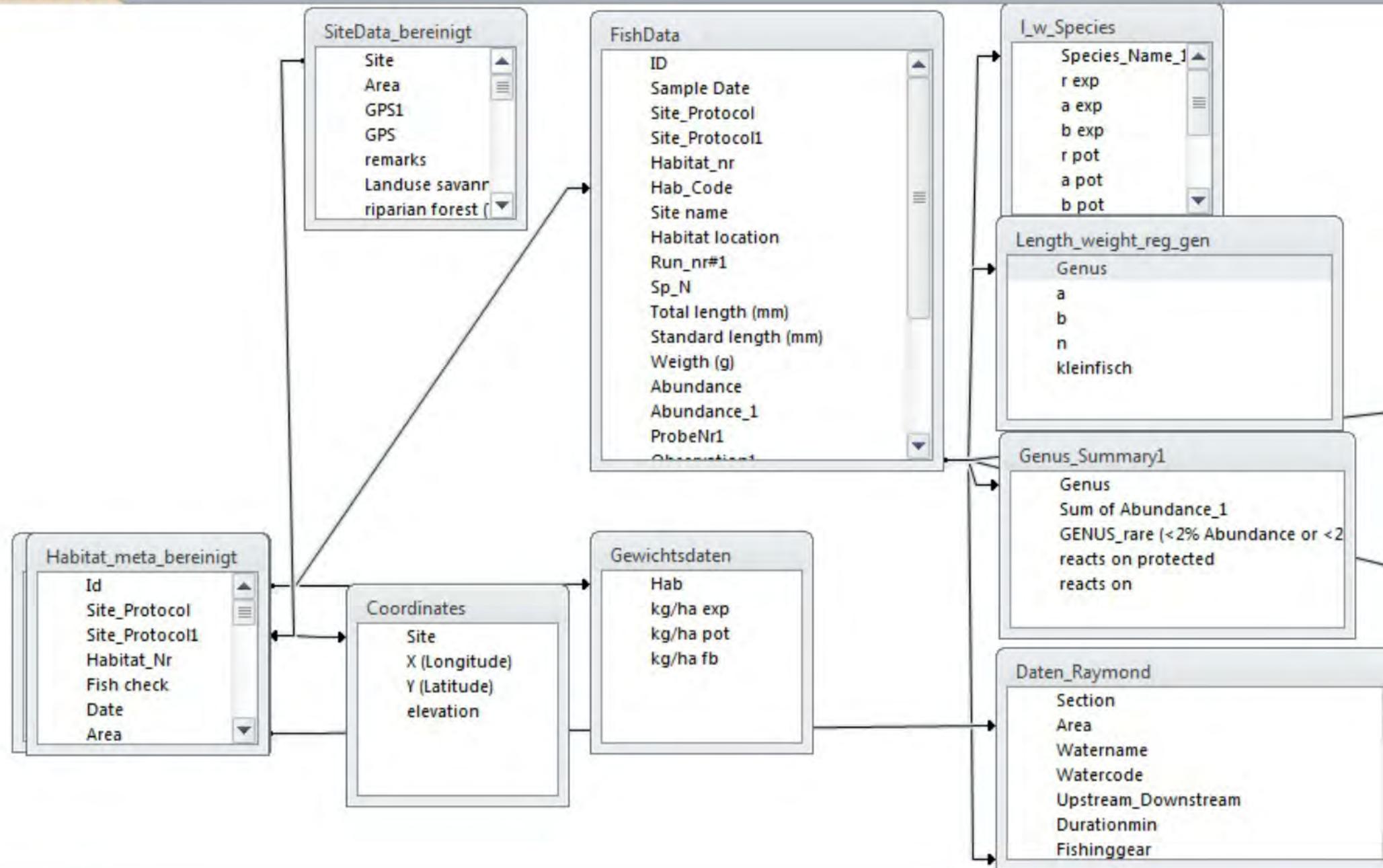
- Access
- Excel
- SPSS
- PC-Ord
- QGIS

# Data

- Own
- Fishbase
- Raymond



## Relationships



# Fish data

## Pressures

### Landuse

### Sampling methods

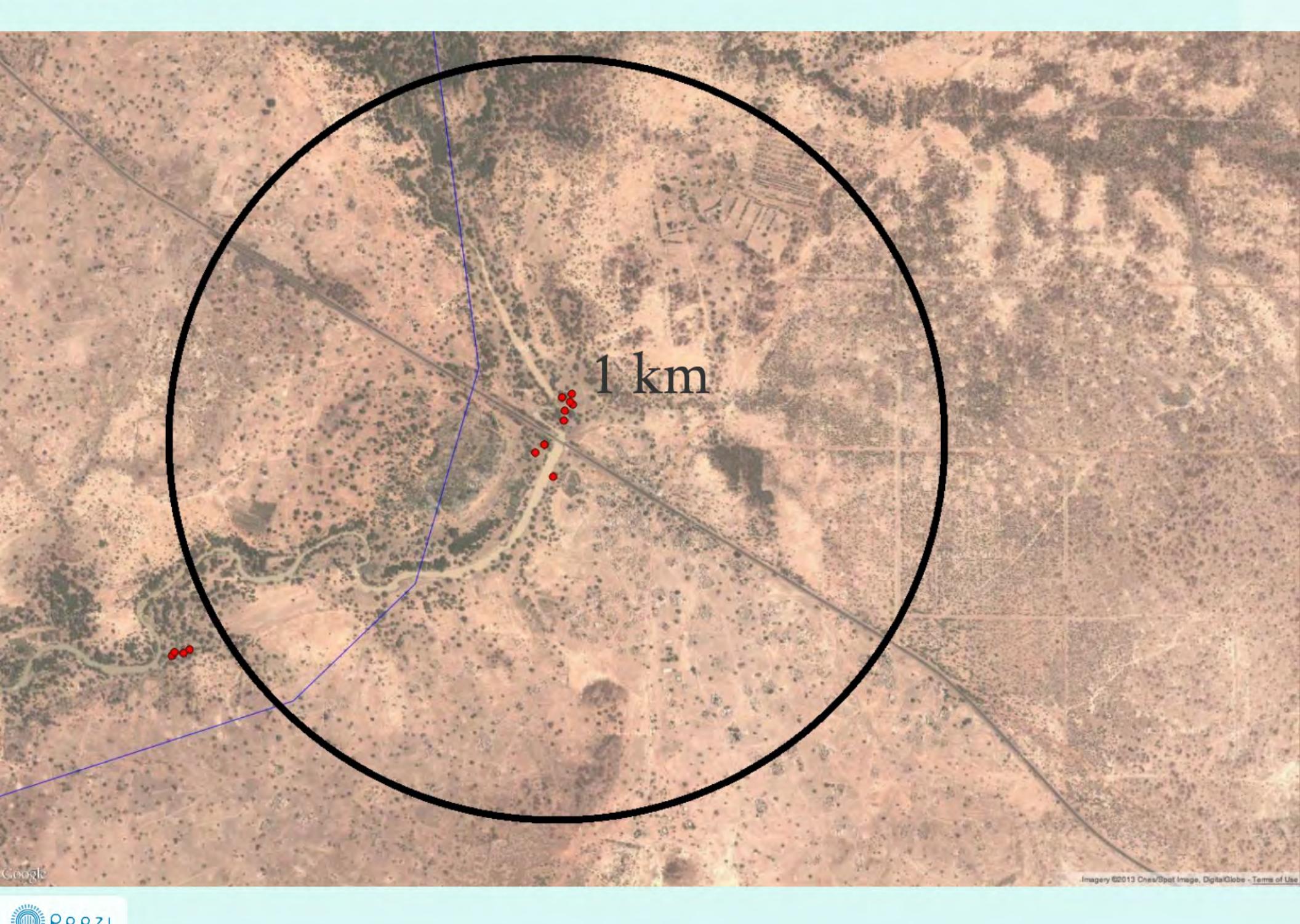
### Physicochemical parameters

Remote: landuse



Site Protocol .....	Site Name.....							Date (dd/mm/yy) .....
Habitat	1	2	3	4	5	6	7	8
Description								
Writer								
GPS-point (N/E)								
GPS-Coordnat								
Run/Throw nr.								
Start time								
End time								
Photo nr.								
Weather								
Fishing method								
Blockage								
Water type								
Fished area (m <sup>2</sup> )								
Distance bank (m)								
Secchi depth (cm)								
Conductivity (µS/cm)								
pH								
Temperature (°C)								
O <sub>2</sub> (%)								
O <sub>2</sub> (mg)								
Probe nr.								
Landuse								
Impact								
Shading (%)								
Structure								
Dam								

CATEGORIES	1	2	3	4	5	6	7	8
weather	sun	cloud	rain	wind				
fishing method	1 aggregat	2 aggregat	gill net	cast net	longline	Nasse fishing	commercial	
blockage	net	electri	barrier					
water type	reservoir	running	con sidearm	dead sidearm	pond	Dissipation	channel	
Landuse	savanna	rice	agriculture	livestock	settlements	roads	forest	protected
	9 cotton	10 vegetables						
structure	tree	xylal	rock	waterpants	reed	outwashed bank		
impact	fishing	sandmining	water abstract	deforestation	channalisation	invasiv plant	nutrient imp	riprap
dam	upstream	downstream	between	free flowing				



1 km

Site Protocol .....

Site Name.....

Date (dd/mm/yy) .....

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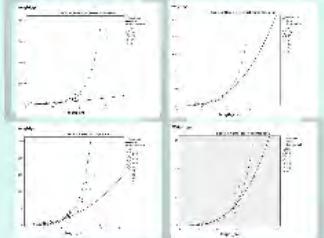
# Data analysis

- Access
- Excel
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# Results so far

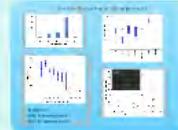
## Methods

### Length-weight regression

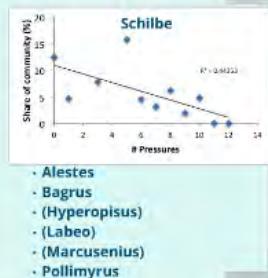
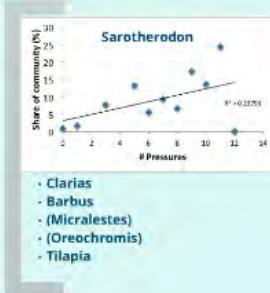


Exclusion of sites

## Pressures



## Possible indicator genera

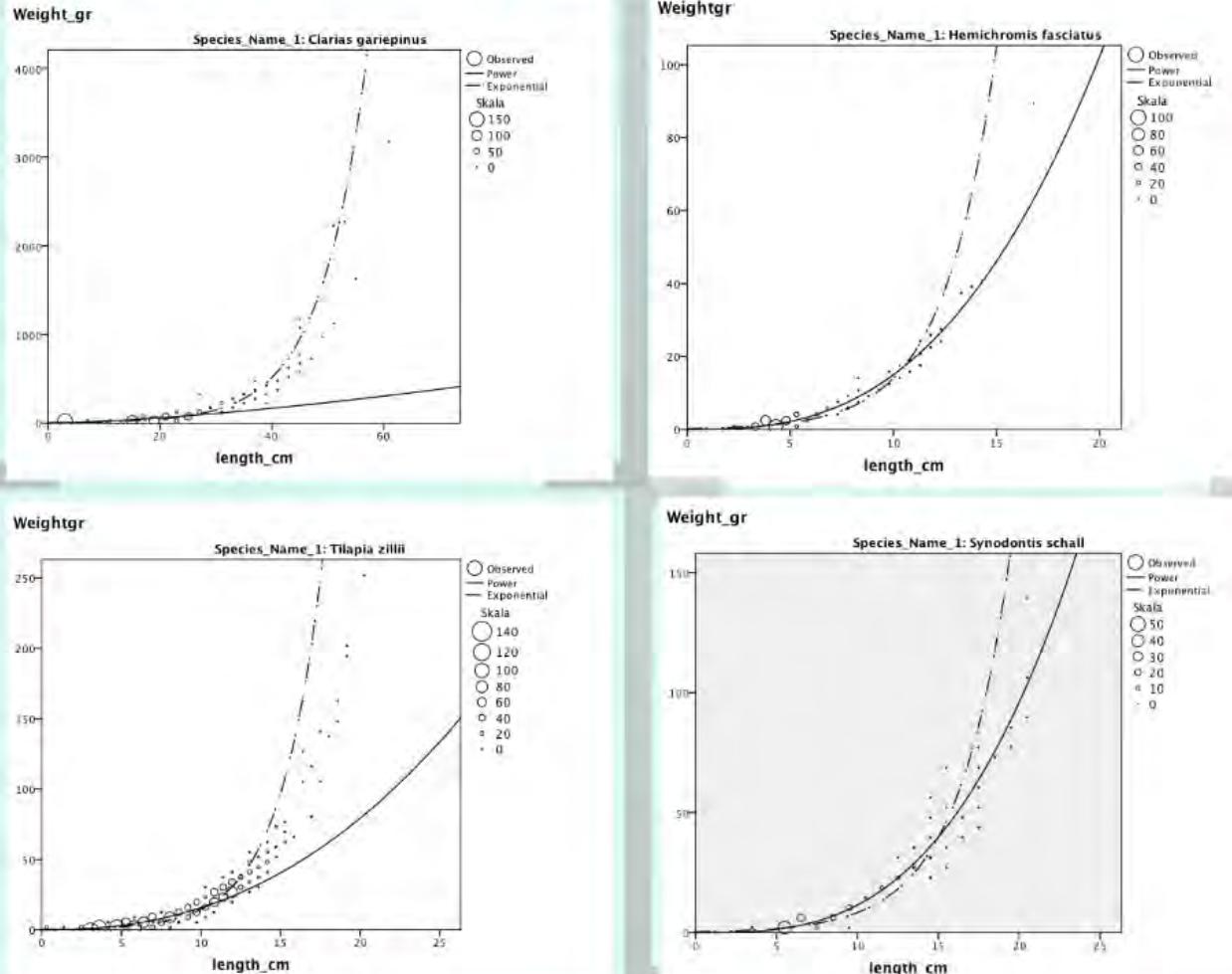


## Exclusively in "reference sites"

- Auchenoglanis
- Ctenopoma
- Citharinus
- Heterobranchus
- Hydrocynus

# Methods

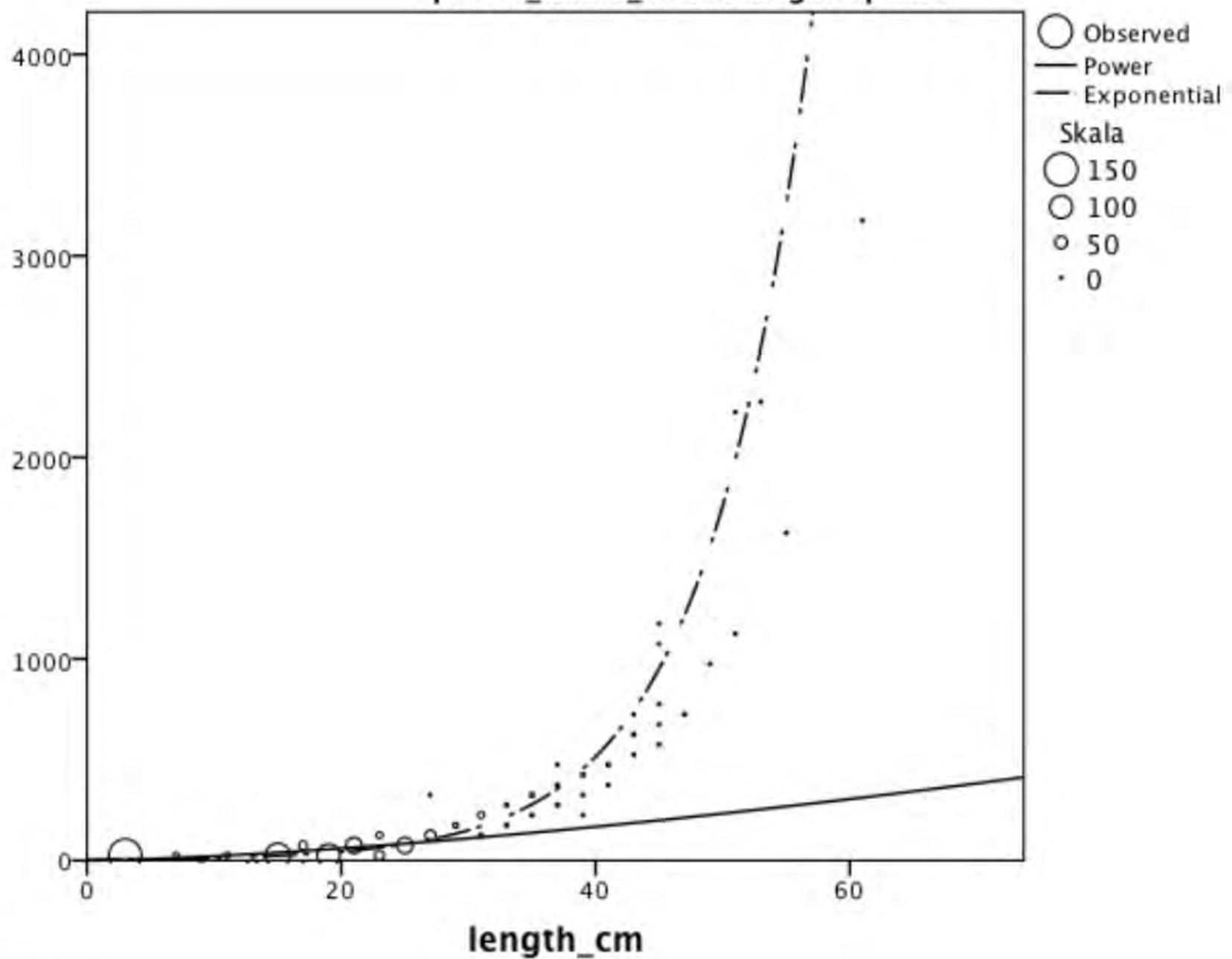
## Length-weight regression



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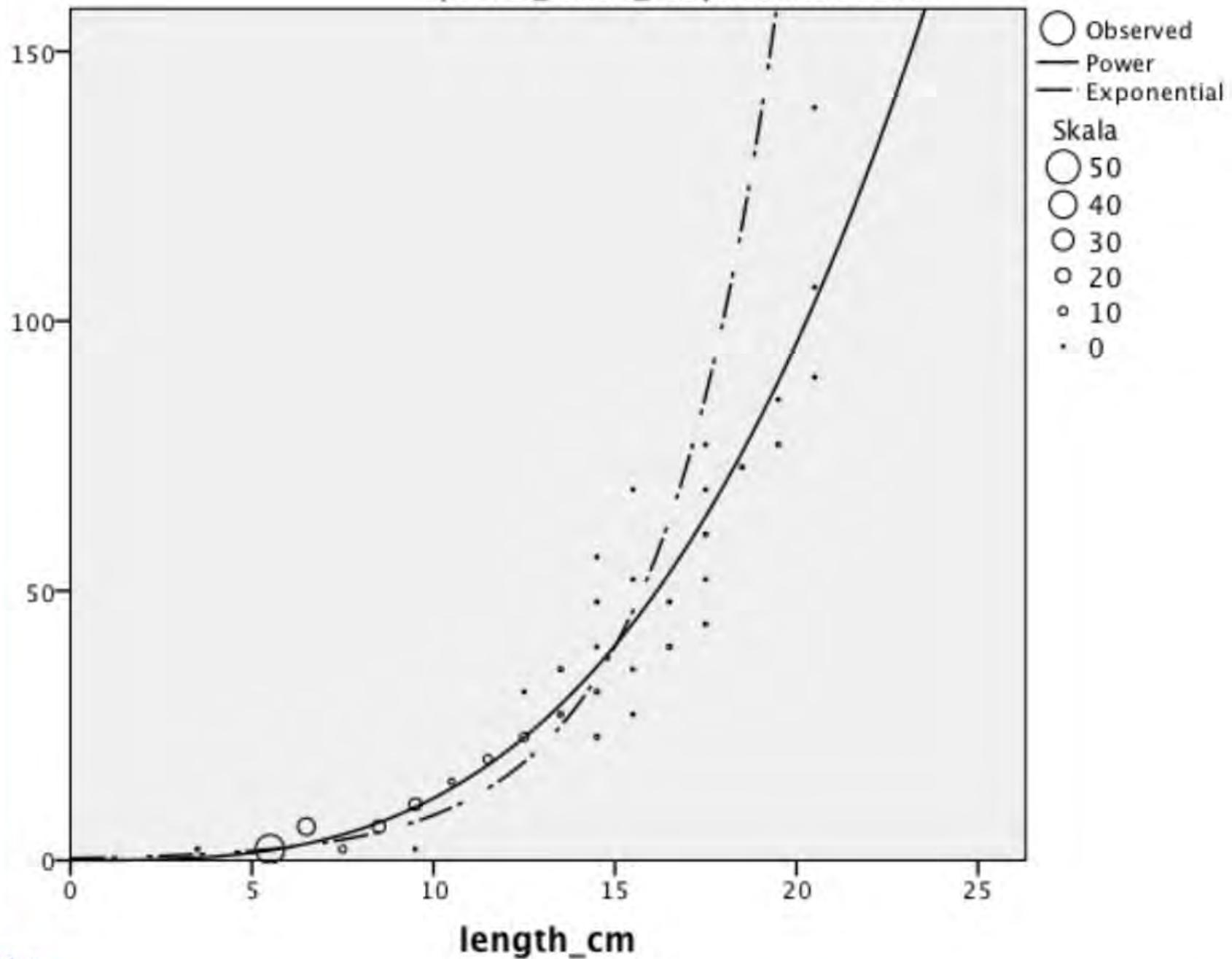
Weight\_gr

Species\_Name\_1: *Clarias gariepinus*



Weight\_gr

Species\_Name\_1: *Synodontis schall*



# Pressures

## Pressure categories

- Fishing
- Deforestation
- Roads
- Water abstraction
- Dams
- Channalisation
- Sandmining
- Nutrient input
- Washing/pollution

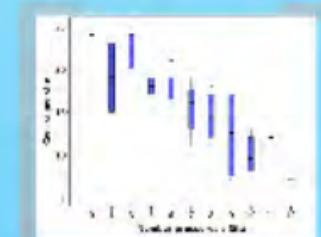
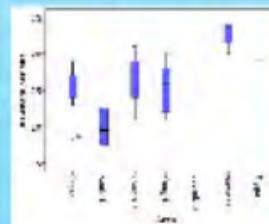
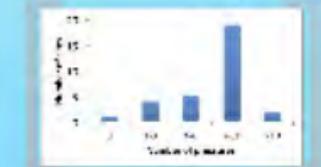


## Landuse categories

- Protected
- Savannah
- Settlement/Urbanisation
- Forest
- Lifestock
- Agriculture
- Rice
- Vegetables
- Cotton



Describe the reaction of fish on pressures



R square:  
0.56 @ Genus level  
0.61 @ Species level



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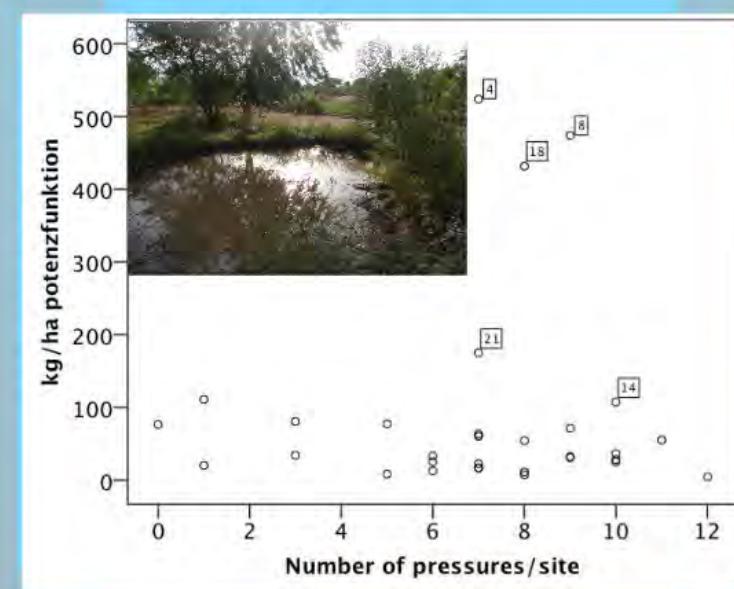
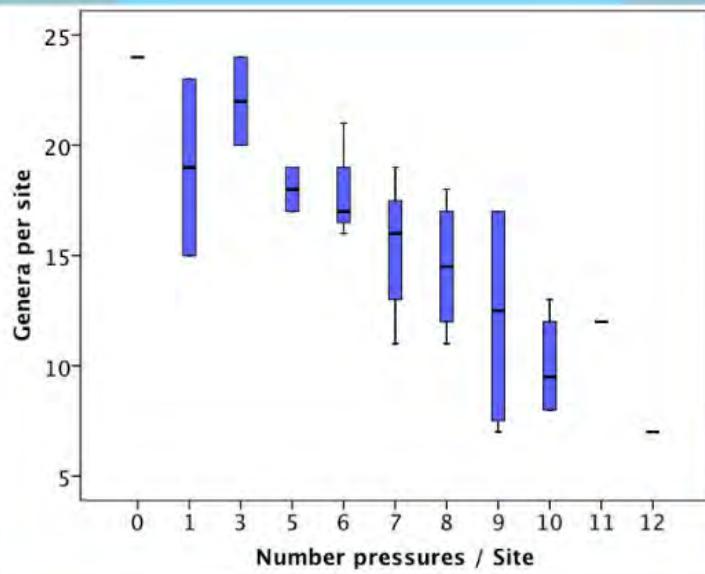
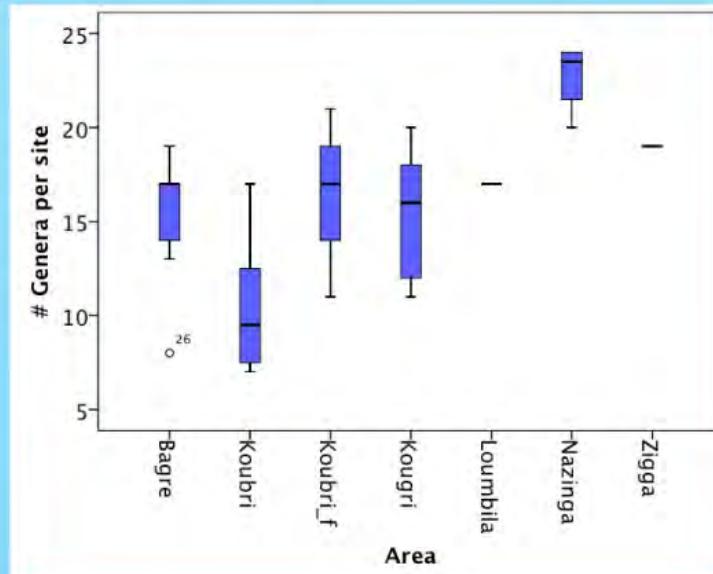
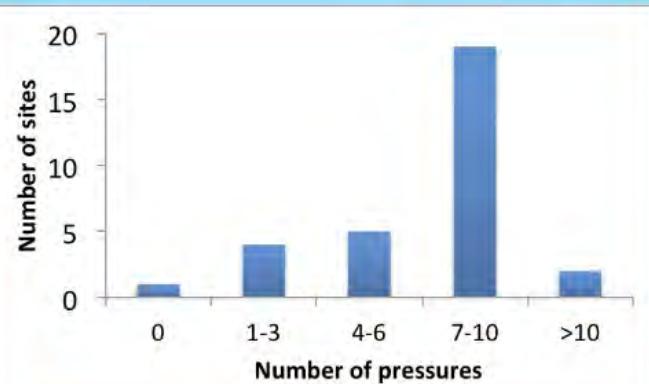


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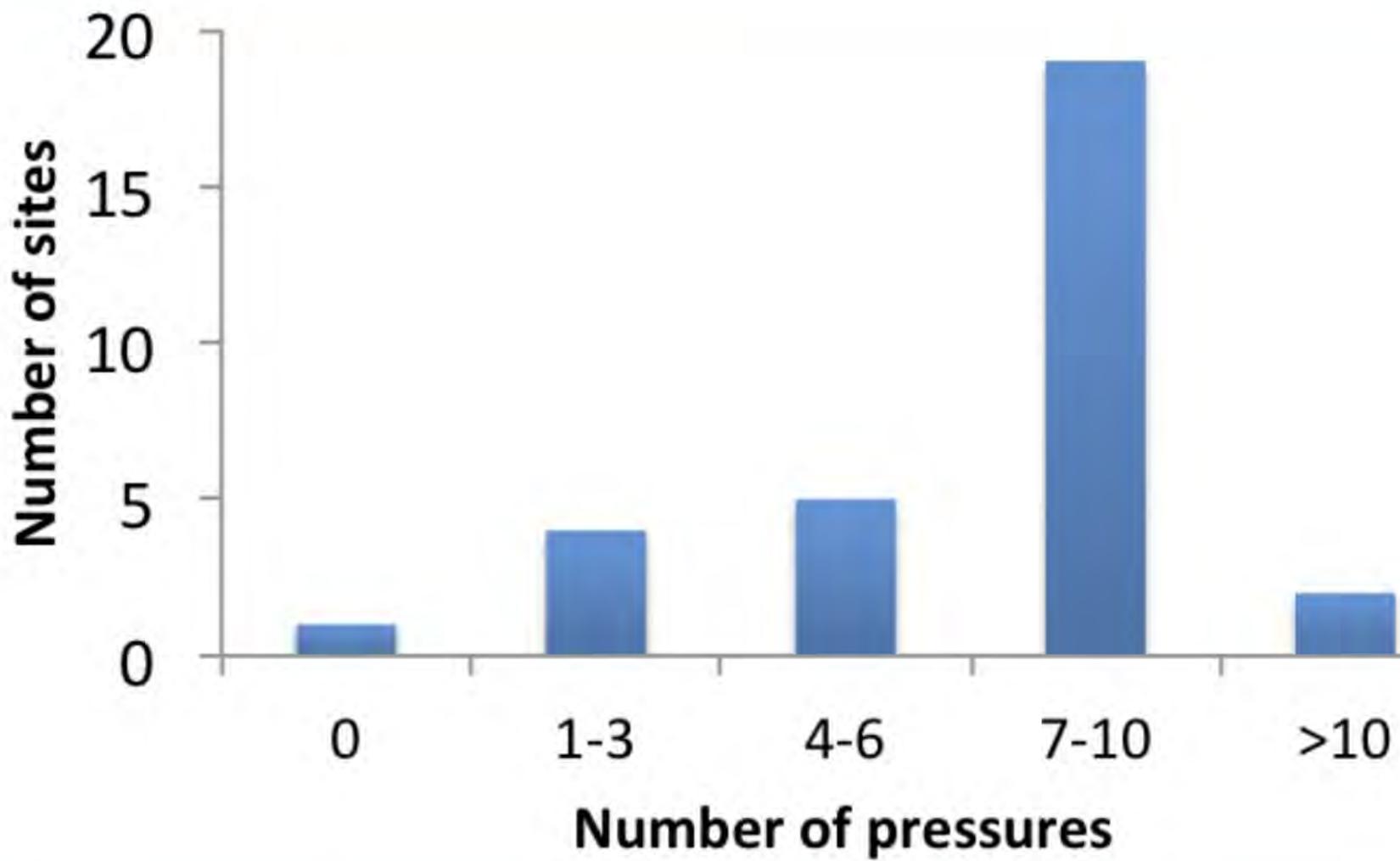
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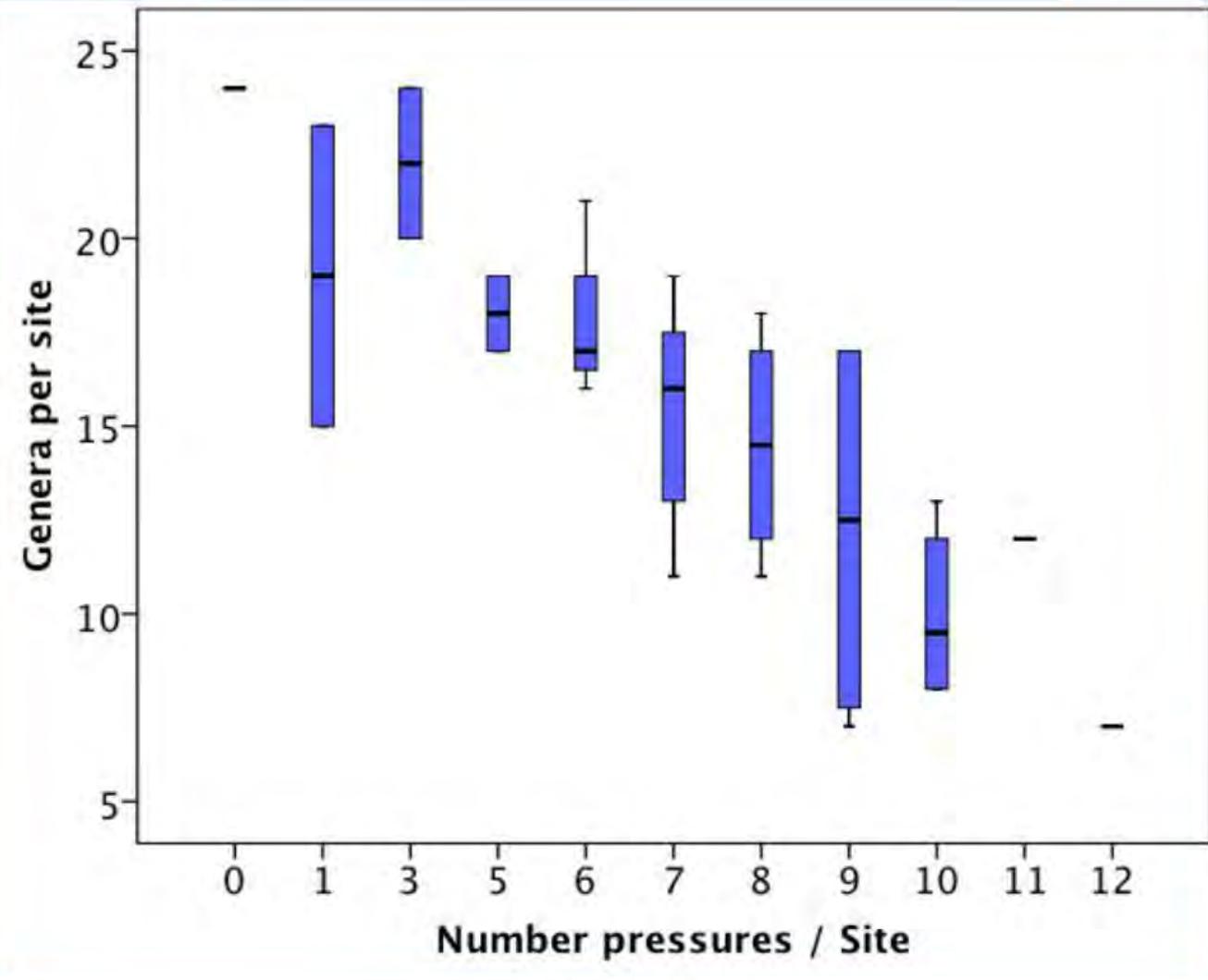


R square:

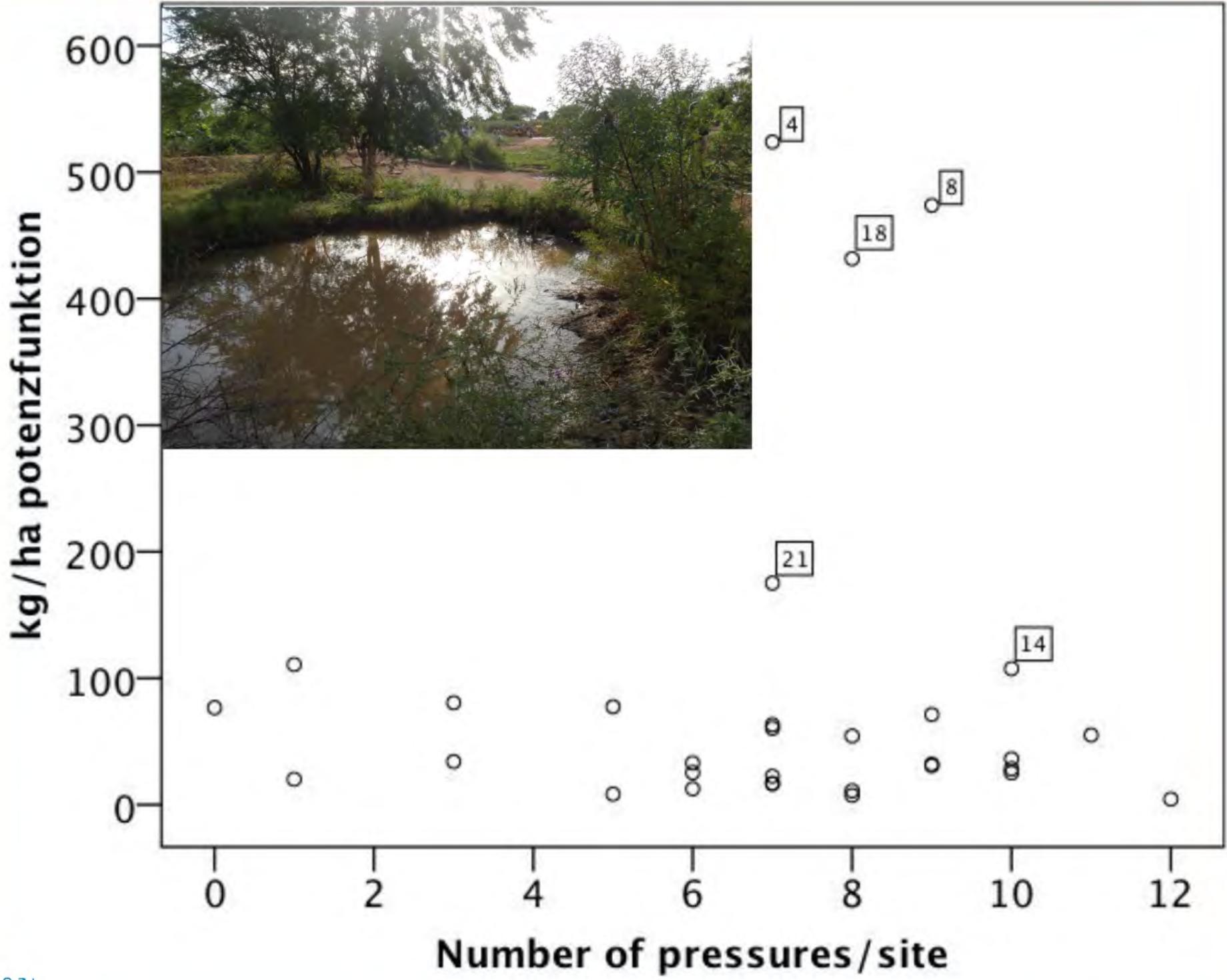
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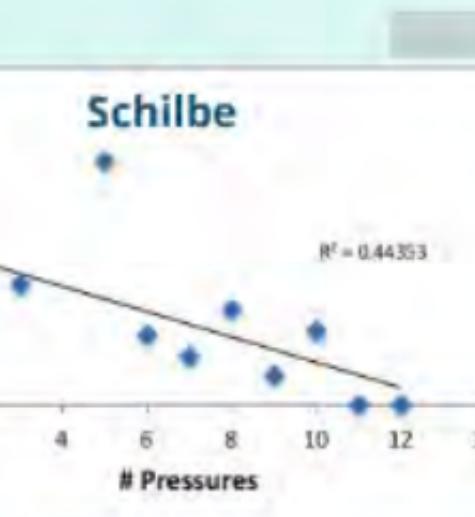
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# Possible indicator genera



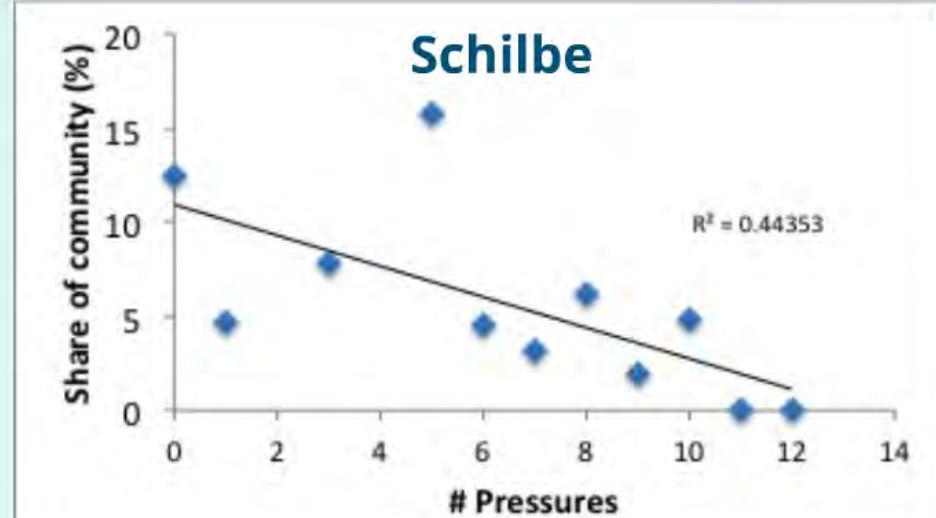
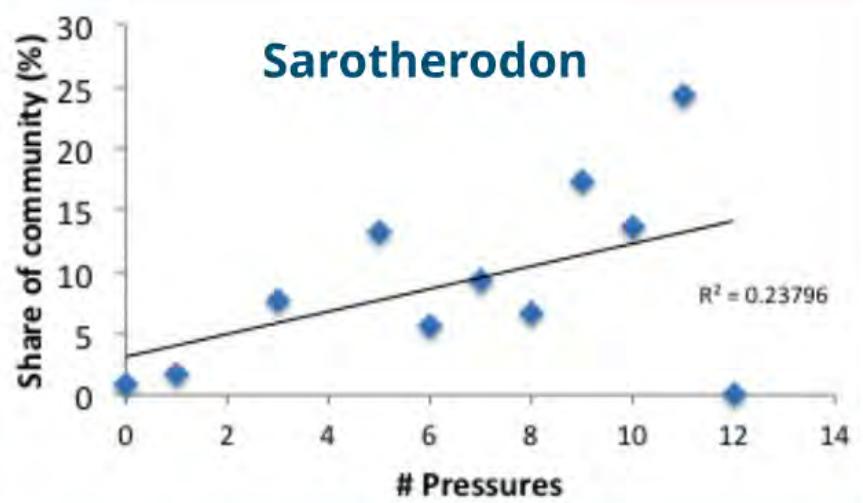
- Clarias
- Barbus
- (Micralestes)
- (Oreochromis)
- Tilapia



- Alestes
- Bagrus
- (Hyperopisus)
- (Labeo)
- (Marcusenius)
- Pollimyrus

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# Discussion

## Methods

Sampling challenges:

- Determination
- Quantitative

Analysis challenges

- Multiple pressures
- Lack of knowledge (metrics + guilds + protection)

## Pressures

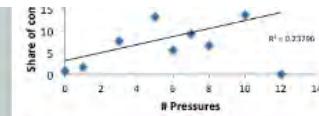
- Human impacts have a significant influence

## Indicator organisms

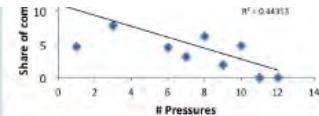
- Species vs Genera
- Genus composition varies with the pressure intensity
- Tolerant species increase, sensitive decrease
- Sentinel species

## Implementation

- Result for Burkinabe PhD students



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**Austria**  
= Austria  
Development Cooperation

**oead\***

**appear**

**BOKU**  
University of Natural Resources and Life Sciences, Vienna  
University of Applied Sciences, Vienna  
University of Vienna, Vienna

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Thanks for your attention!