



Kwame Nkrumah University of  
Science & Technology, Kumasi, Ghana

# Xenobiotic **S**ubstances and **H**eavy Metals in the **E**nvironment – **A** **T**hreat to **H**ealth, **E**cosystems and **D**evelopment

- **SHEATHE** -



KNUST, Ghana



Aarhus University, Denmark



<http://www.sheathe.org/>



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# The SHEATHE project



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## 5-Year DANIDA-Funded Research Collaboration



### KNUST, Ghana

- Godfred Darko
- Marian Asantewaa Nkansah
- Rudith King
- Francis Momade
- Robert Abaidoo



### Aarhus University, Denmark

- Jesper Lath Bak
- Anne Mette Lykke
- Katrin Vorkamp
- Peter B. Sørensen



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# **SHEATHE overall objective**

- **To provide new knowledge on dispersal and effects of heavy metals and xenobiotic substances in the Ghanaian environment**
- **To describe the dispersal of emissions from different sources**
- **To identify relative contribution to concentrations and trends on background areas at country scale**



# Project methodology

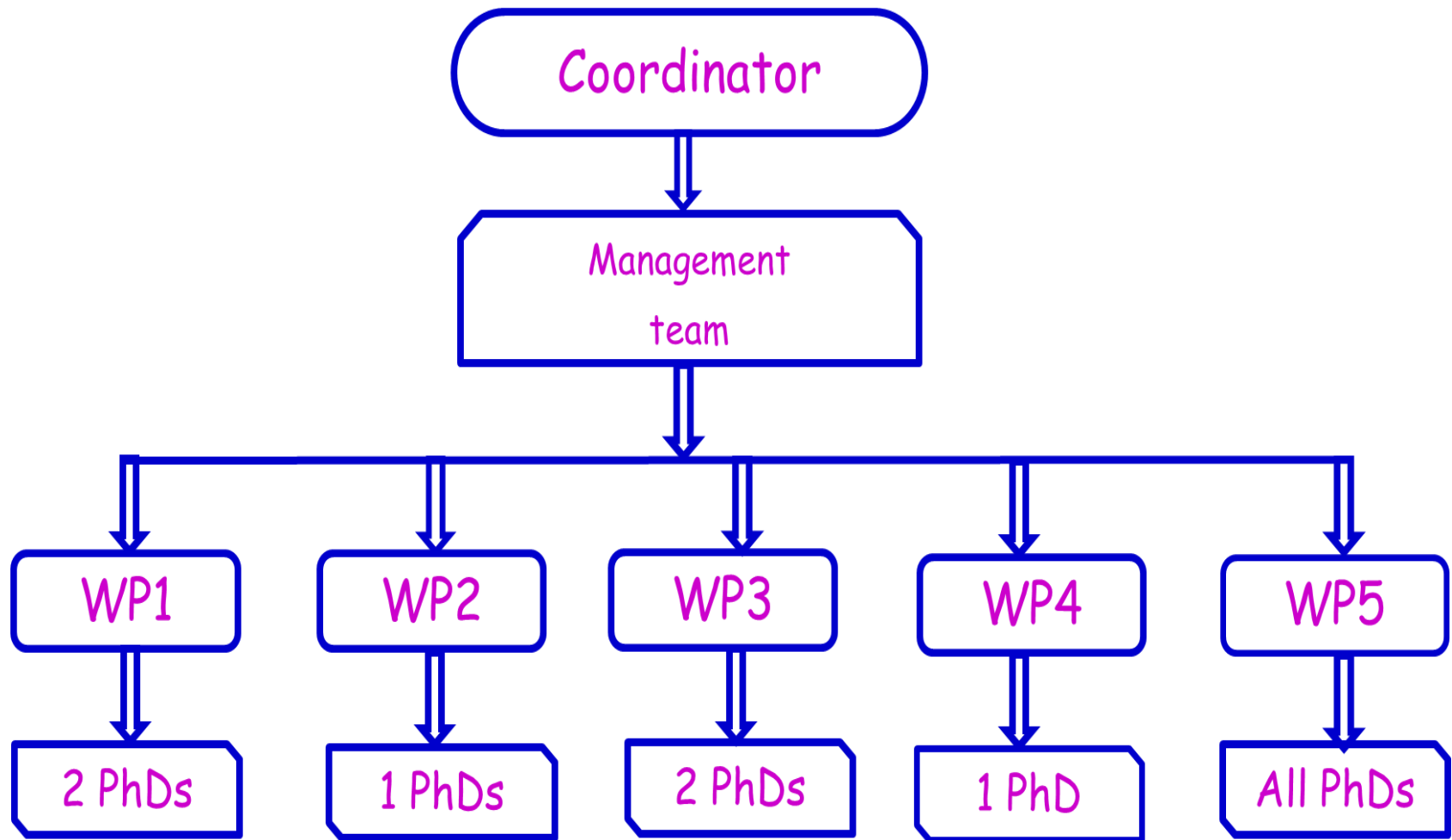
- Intensive desktop review
- Background levels mapping
- Data from both polluted and unpolluted sites at different scales
- Statistical analysis for spatial and temporal patterns
- Fate and exposure modelling

Project focuses on soil, water and air, and does not include sampling biota (except crops in one local area) and humans

The effects of access to information in risk handling will be studied



# Project organization



# **WP 1: Country scale assessment of pollution patterns and trends**

- **Data analysis will be made both with classical (geo) statistical methods and with the use of models**
- **Data on soils, population density, land cover/land use and climate will be included in the analysis**



# WP 2: Local scale assessment of pollution patterns and trends

- Intensive studies of local scale variability in concentrations, emissions, dispersal and deposition will be undertaken in 3 ASM + 2 WEEE sites
- One ASM area will be selected for analysis of transfer routes via organic waste and compost, and for study of crop concentrations



# WP 3: Community based risk assessment

- Effect of access to information in developing risk handling strategies will be investigated in 3 ASM and 2 WEEE communities
- The use of information in risk assessment and risk handling both on individual and community level will be investigated



# WP 4: Data collection, measurements and chemical analysis

- Data collection campaigns will use the same equipment and analytical procedures at both the local- and country scale
- A research drone carrying Hg analyser will be used for the measurement of transects of Hg concentrations in air

# Expected outcomes and outputs

- Background values for heavy metals and xenobiotic substances in Ghana
- Improved understanding of how different anthropogenic activities have affected concentrations
- Model systems to describe the chain from activities over emissions, dispersal/transport in different media to predicted environmental concentrations on local and landscape scale
- Scenario analysis for future concentrations



# Expected outcomes and outputs

- Increased understanding of how information can be used in risk assessment and risk handling
- Competence building at KNUST
- 6 PhDs at KNUST with joint supervision from KNUST and AU
- Dissemination of information via local popular media and publications in Int'l journals



# Capacity strengthening

- Increased competences in modelling and bridging of data from different scales, and participatory risk assessment at KNUST
- Increased capacity of KNUST in conducting large-scale interdisciplinary field studies addressing environmental and health risks
- Increased competence in disseminating and communicating research results
- Environmental modelling laboratory for the Department of Chemistry



# THANK YOU



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