ACC DAR

CENTRO INTERUNIVERSITARIO DI RICERCA PER LO SVILUPPO SOSTENIBILE - CIRPS

SAPIENZA UNIVERSITÀ DI ROMA

Adapting to Climate Change in Coastal Dar es Salaam

Kick off meeting
Dar es Salaam, 28th April 2011

Liana Ricci

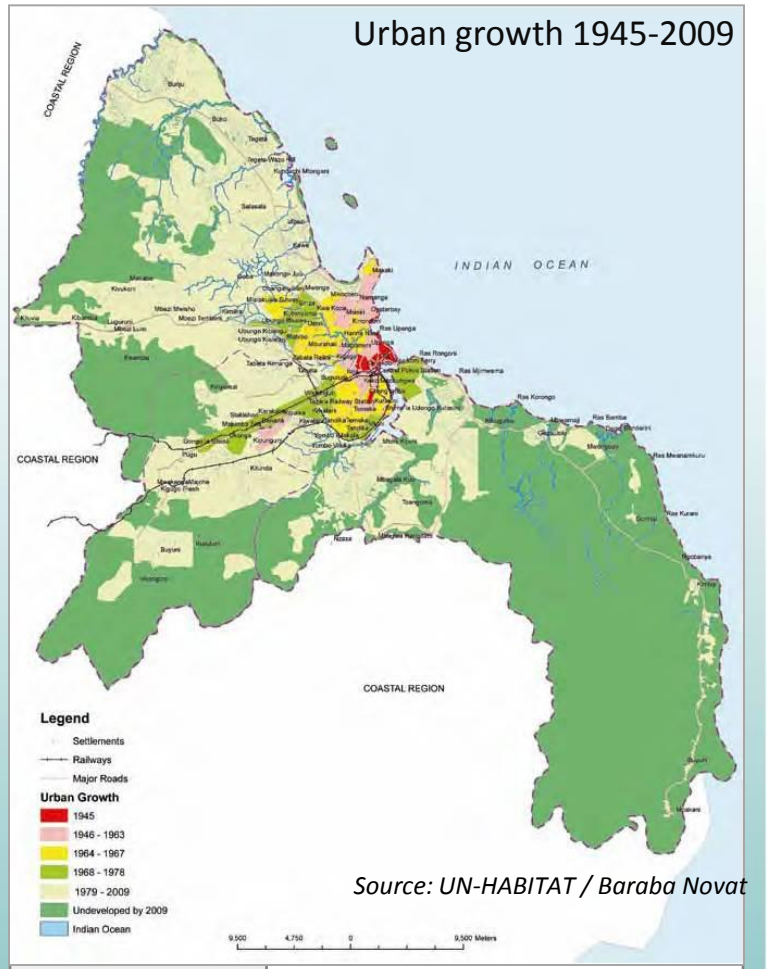
Background: Setting the Scene

Cities are growing

- Dar es Salaam is the **largest city in Tanzania** and the 3th fastest growing urban agglomeration in Africa (**growth rate 4.5%,** 2015-2020); peri-urban areas constitute 2/3 of the city
- Between 70% and 80% live in **informal settlements**

Climate is changing

- Flooding, sea level rise, drought, changes in rain patterns, extreme weather events
- Temperature will rise and rainfall will increase



Area:	1,393 km²
Population :	2.698.651 (2005)
Growth rate	4,2%

Background: Defining Adaptation

Initiatives and measures to reduce the **vulnerability** of people against actual or expected climate change effects

We focus on:

- vulnerability of peri-urban residents' livelihoods in coastal areas;
- watershed salinization, coastal erosion, flooding;

Background: Defining Adaptive Capacity

Vulnerability: exposure, sensitivity, and **adaptive capacity**

> *"The capacity to **modify exposure** to risks associated with climate change, **absorb and recover** from losses stemming from climate impacts, and **exploit new opportunities** that arise in the process of adaptation"*

Adaptive capacity and planning

- Adaptive capacity can be a major influence on the eventual impacts of CC
- It is strictly linked to social systems and capable of influencing them as they cope with CC

Background: Pilot Studies

1. Assessing Peri-urban Livelihoods and Adaptive Capacity

2. Assessing Social Vulnerability to the Salinization of the Coastal Aquifer

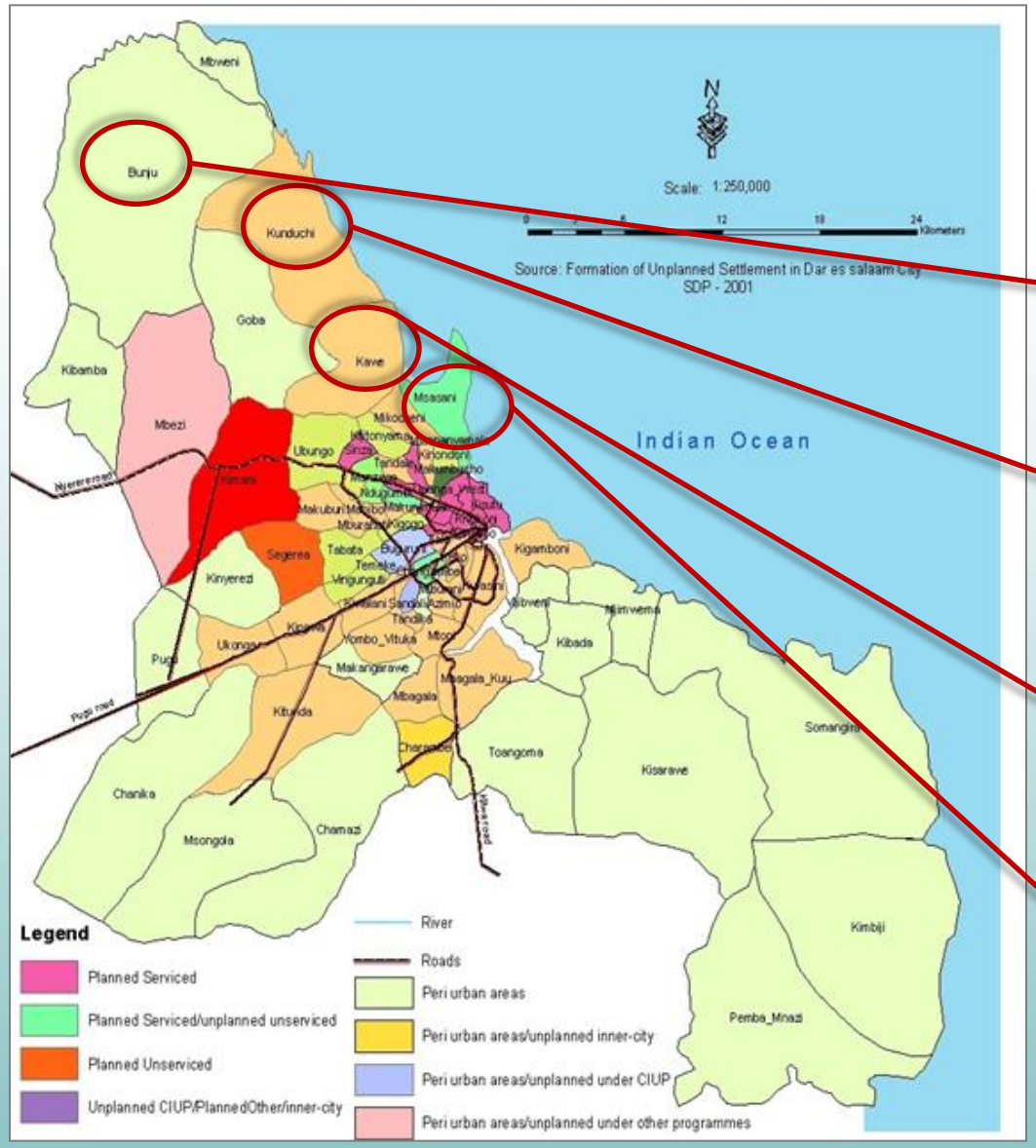
Assessing peri-urban Livelihoods and Adaptive Capacity

Aim of the study

To understand **how people** in peri-urban areas **are coping** with environmental changes and what autonomous adaptation strategies and practices they are performing

To highlight opportunities and challenges for **enhancing peoples' adaptive capacity**

Assessing peri-urban Livelihoods and Adaptive Capacity



Selected Wards

Bunju Ward:
- *Bunju A*
- *Boco*

Kunduchi Ward:
- *Madale*
- *Mtongani*

Kawe Ward
- *Makongo*
- *Changanikeni*

Msasani Ward
- *Mikoroshoni*
- *Bonde La Mpunga*

Kinondoni Municipality

Assessing peri-urban Livelihoods and Adaptive Capacity

Household questionnaires and community adaptive capacity

Areas Selection Criteria

- coexistence of both urban and rural activities (agriculture, livestock, businesses, schools, transport)
- informal settlements
- low-medium density settlements (one lot has from 0.2 to 3 ha)
- settlements located in areas with different environmental characteristics (coastal and inland areas, with different morphology)
- settlements close to major natural elements (rivers, ocean, wetland, forest)

Household Selection Criteria

- socio-economic and cultural heterogeneity (education, income, etc)
- stably settled
- Livelihoods dependent on both urban and rural activities and resources

Investigation Issues

- **Rural-urban interaction**
- **Access to resources** (land, water, energy, etc.)
- **Environmental management** (water, waste, soil, etc.)
- Climate change: environmental transformations and **autonomous adaptation strategies**

Assessing peri-urban Livelihoods and Adaptive Capacity

Results: Rural-urban Interaction

- Peri-urban areas are not exclusively characterized by rural to peri-urban migration flows; **urban to peri-urban migration** also exists
- A **plurality of activities and physical patterns** exist which are based on urban and peri-urban interdependencies
- The majority of respondents (83%) wish to live in environments with **"free" spaces for living**

Daladala: used by 90% of the respondents, 67% on a weekly basis

Agriculture and livestock are the main source of livelihood (97%)

Other activities street vendors and small business

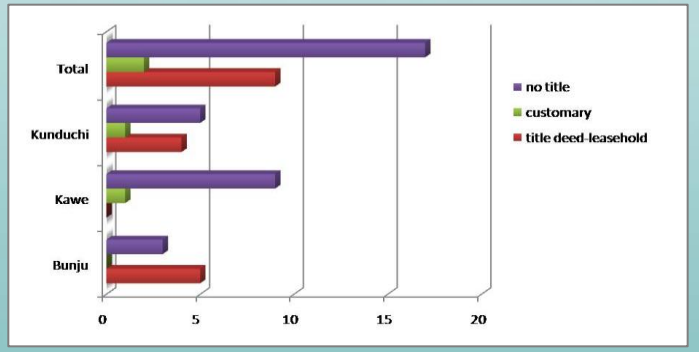
Assessing peri-urban Livelihoods and Adaptive Capacity

Results: Access to Resources

- **60% do not have land title** (for house and land)
- more than 30% have a **leasehold** title and the remaining 7% own a **customary** title




- 26% pay fees for water and electricity
- 9% pay for waste collection
- “indirect” and informal fiscal systems



Assessing peri-urban Livelihoods and Adaptive Capacity

Results: Environmental Management

- 94% manage waste autonomously:
  - burning, abandoning and burying waste (46%)
  - recycling useful materials and composting organic waste to be reused as fertilizer (46%).
  - collecting materials, such as plastics or metals, for sale (8%)

- Autonomous water management: rain water harvesting, ...
- Maintenance of roads, canals, common spaces etc.

Plastic collection

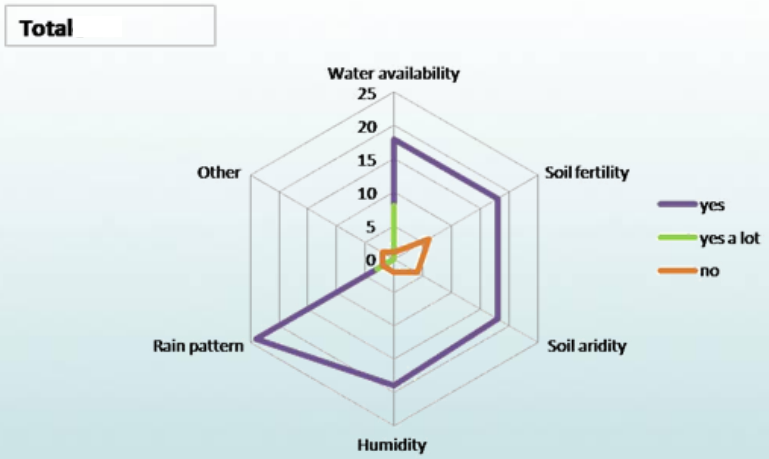
Composting organic waste and manure

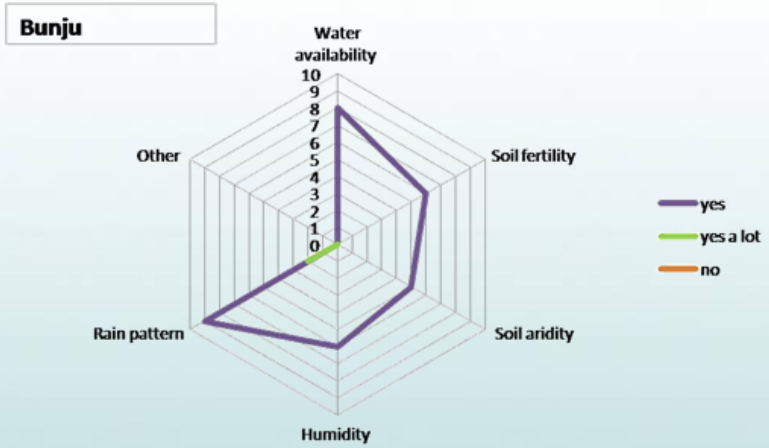
Tank 20l: managing water

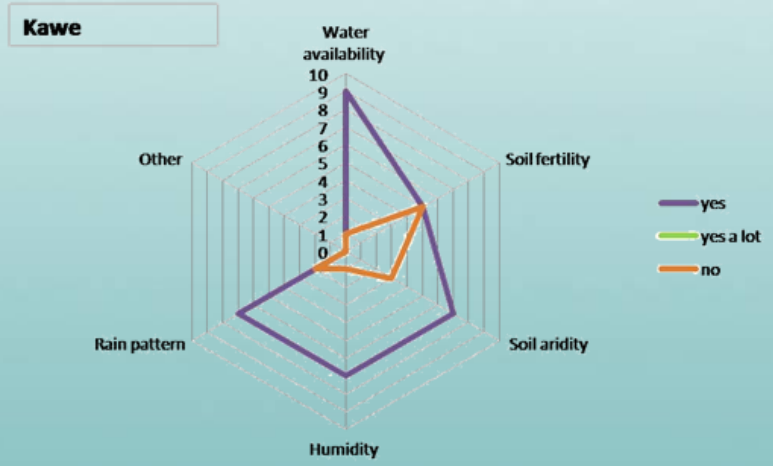
Assessing peri-urban Livelihoods and Adaptive Capacity

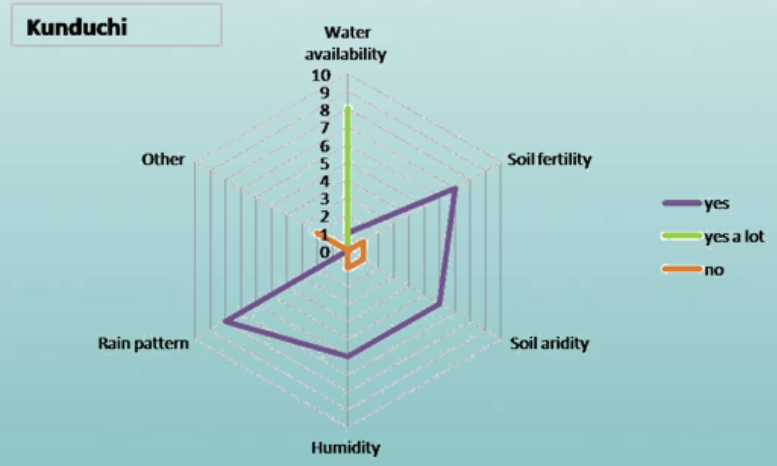
Results: Climate Change Adaptation

Observed environmental changes









Assessing peri-urban Livelihoods and Adaptive Capacity

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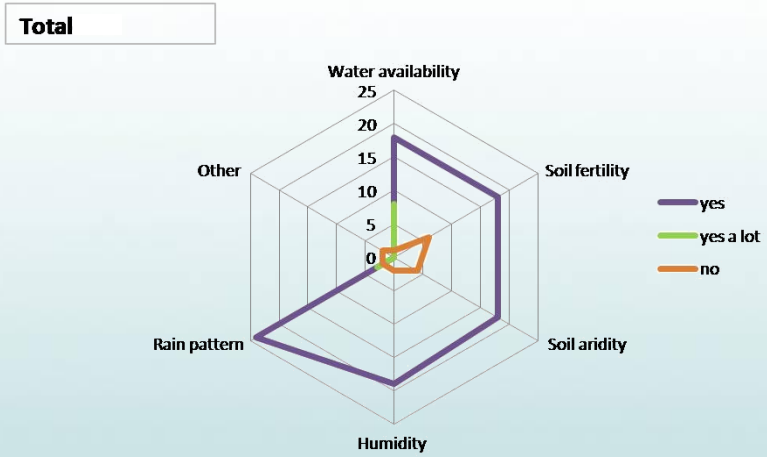
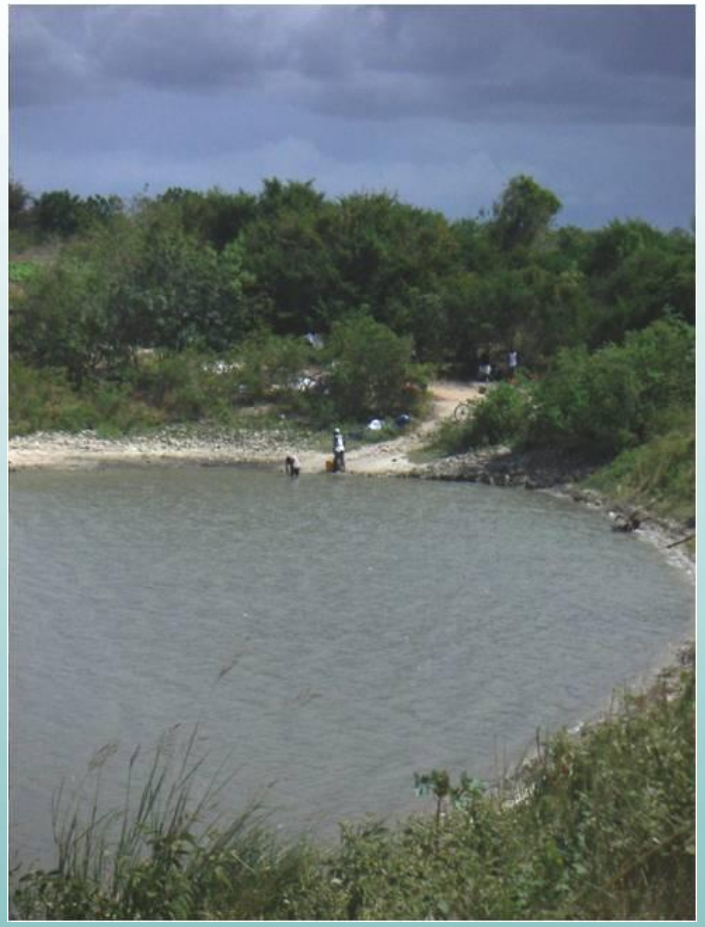




Kunduchi, Mtongani

Fish market

Assessing peri-urban Livelihoods and Adaptive Capacity

Results: Autonomous Adaptation

Implemented adaptation strategies

- changed crop systems (e.g. moving from rice to cassava, which requires less water)
- stop farming and start keeping livestock
- digging for water harvesting
- making embankments
- ….

Foreseen adaptation strategies

- change of employment, (or transition from activities dependent on natural resources to activities only partially or indirectly dependent on them; e.g. trade or small business).
- moving to another area or returning to their rural native region
- look for temporary job
- Intensify/introduce agriculture and livestock
- …

Assessing peri-urban Livelihoods and Adaptive Capacity

river embankments

shallow pit

Assessing Social Vulnerability to the salinization of the coastal aquifer

Aim of the study

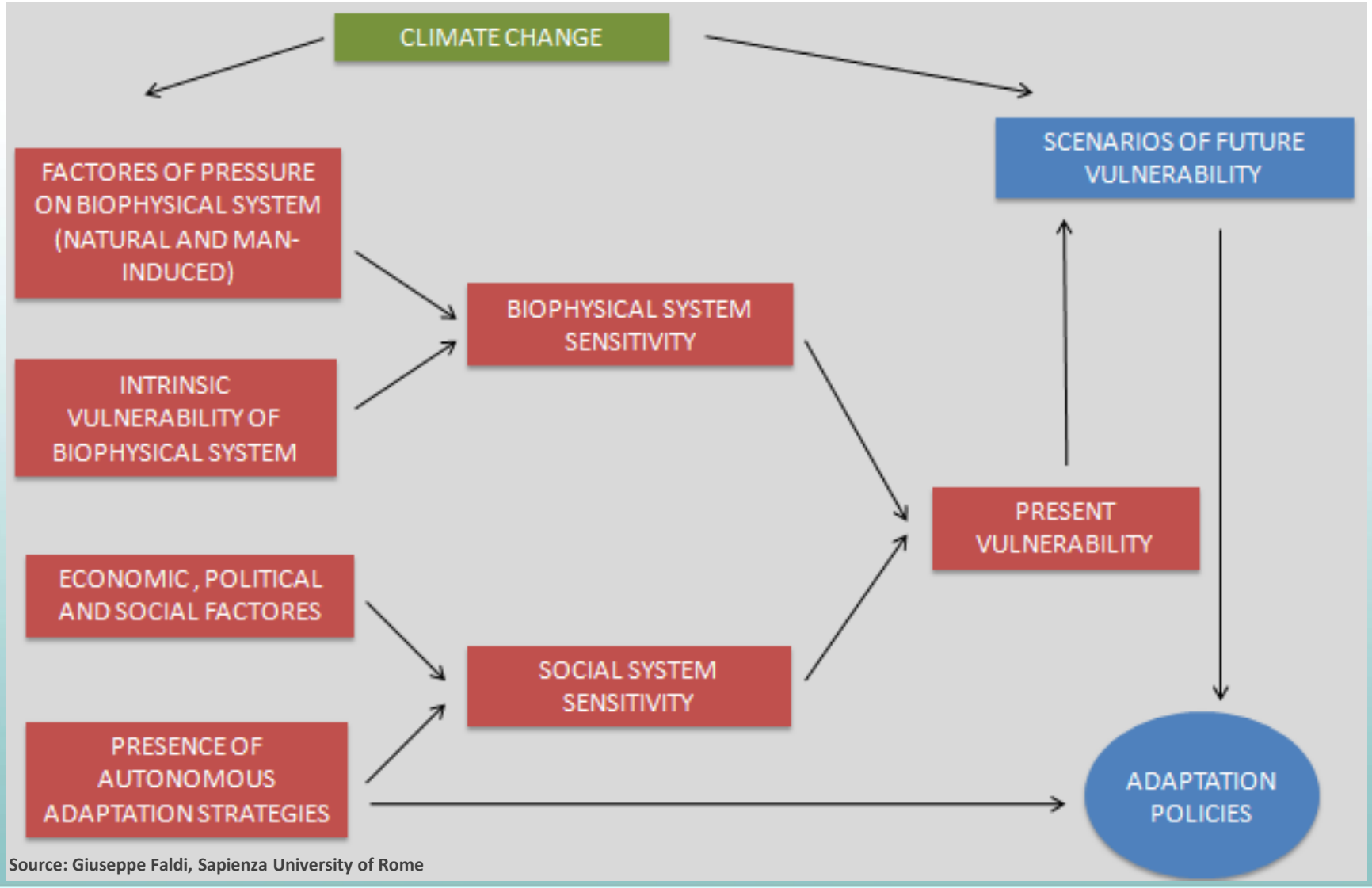
- To develop a methodology to evaluate vulnerability to saline intrusion in Dar es Salaam

Espected results

- The identification of critical areas
- The enhancement of knowledge for adaptation

Source: Giuseppe Faldi; Sapienza University of Rome

Assessing Social Vulnerability to the salinization of the coastal aquifer



Source: Giuseppe Faldi, Sapienza University of Rome

Assessing Social Vulnerability to the salinization of the coastal aquifer

SENSITIVITY ANALYSIS OF THE BIOPHYSICAL SYSTEM

Study of the progression of salt water intrusion in the coastal aquifer within

→ Sensitivity level of biophysical system with respect to saline contamination factors

SENSITIVITY ANALYSIS OF THE SOCIAL SYSTEM

Definition of the community's level of dependence on groundwater through the identification of prevalent typologies of water supply in different settlements present within the study area (use of 3 evaluation criteria).

→ Sensitivity level of the social system with respect to the possible worsening of groundwater

RESULTS

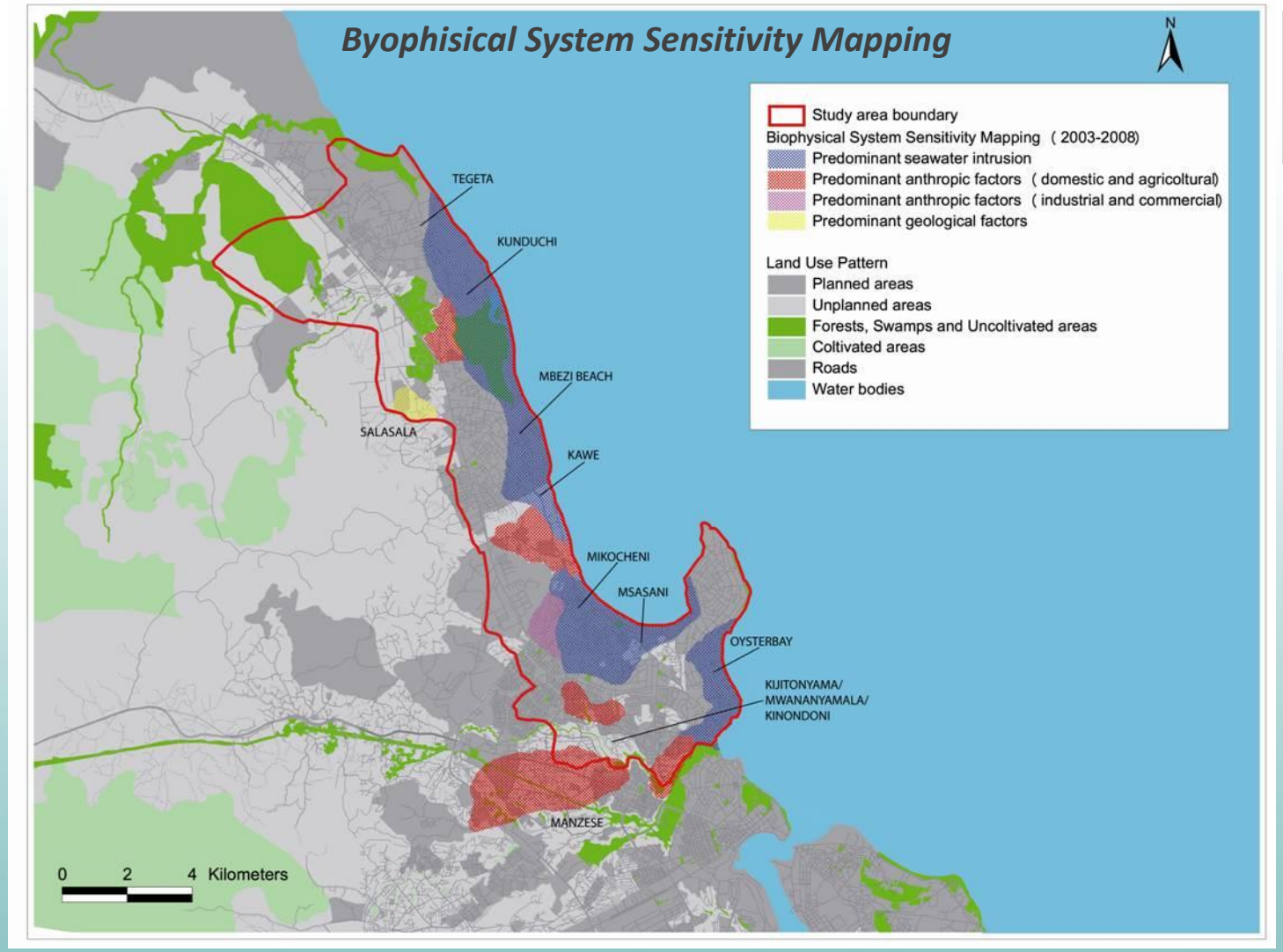
EVALUATION OF THE VULNERABILITY IN THE COMMUNITY WITH RESPECT TO SALT WATER INTRUSION IN THE COASTAL AQUIFER

Overlapping of areas where there is a predominance of marine contamination factors in the coastal aquifer with areas where inhabitants demonstrate a high dependence on groundwater.

→ Community's level of vulnerability with respect to the salinization of the coastal aquifer (identification of critical areas)

Source: Giuseppe Faldi, Sapienza University of Rome

Assessing Social Vulnerability to the salinization of the coastal aquifer



Source: Giuseppe Faldi, Sapienza University of Rome

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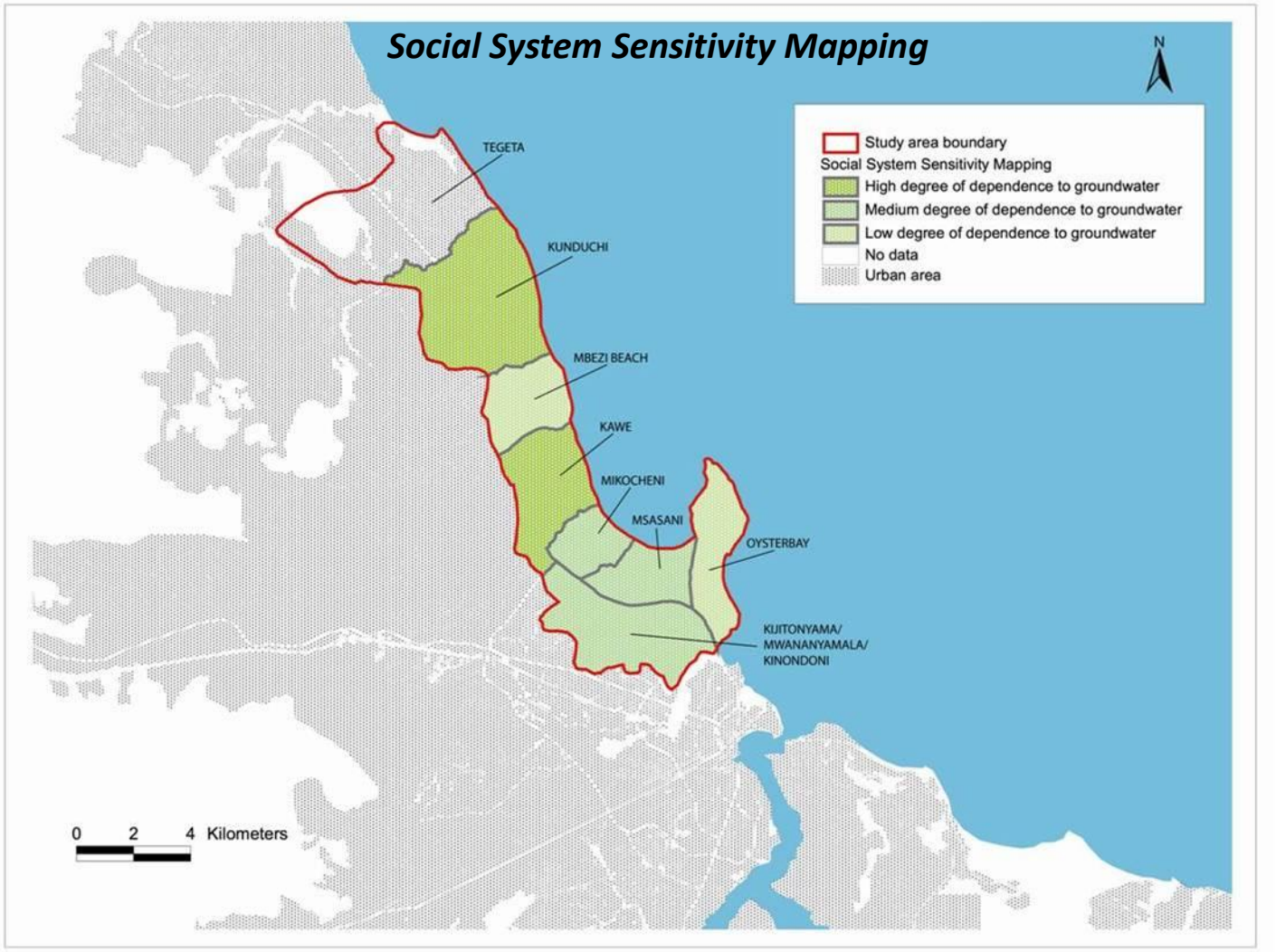

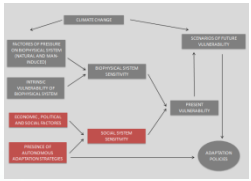

Source: Giuseppe Faldi, Sapienza University of Rome

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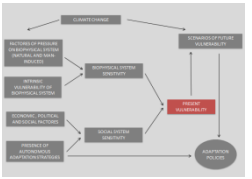
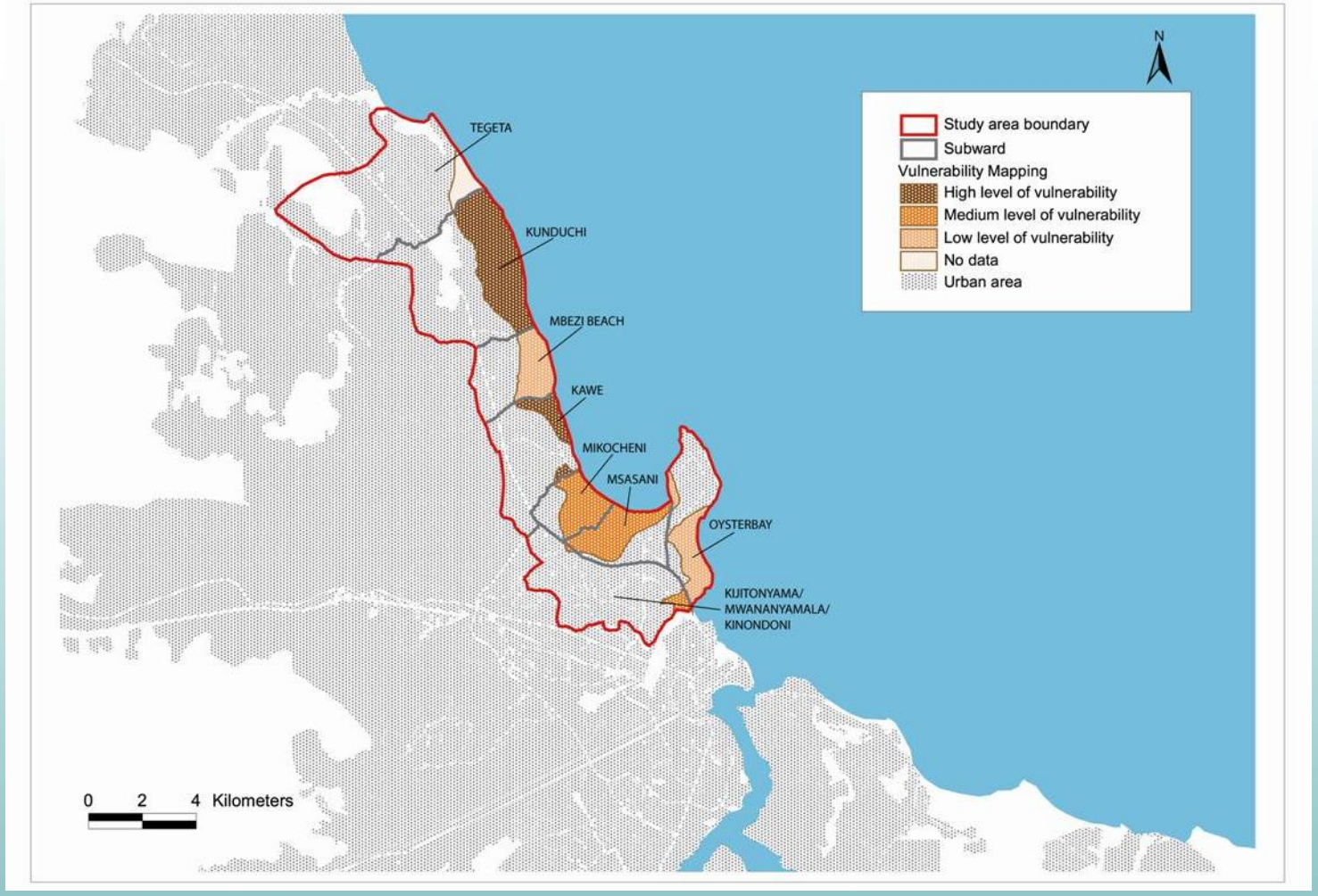
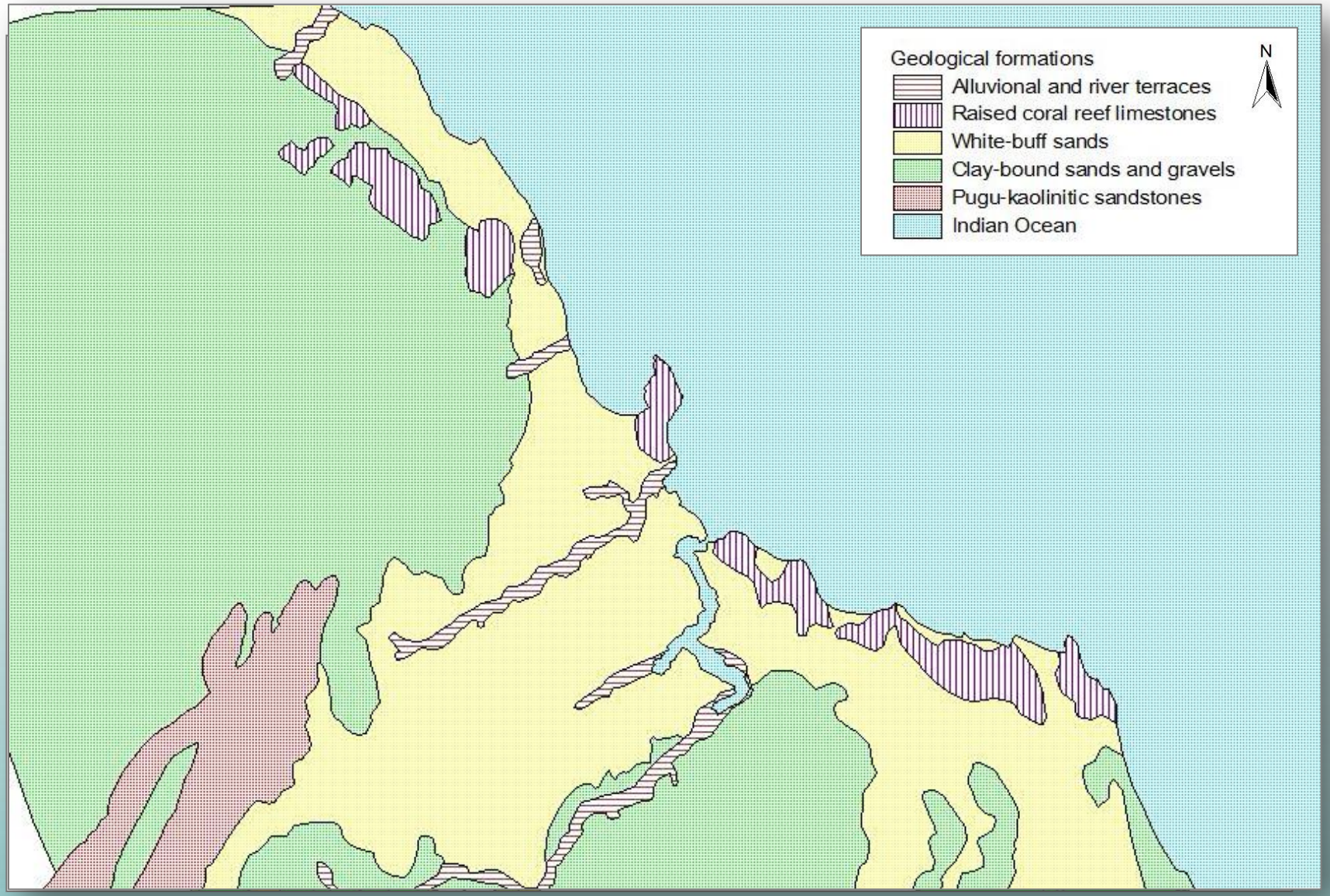




KUNDUCHI

KAWE

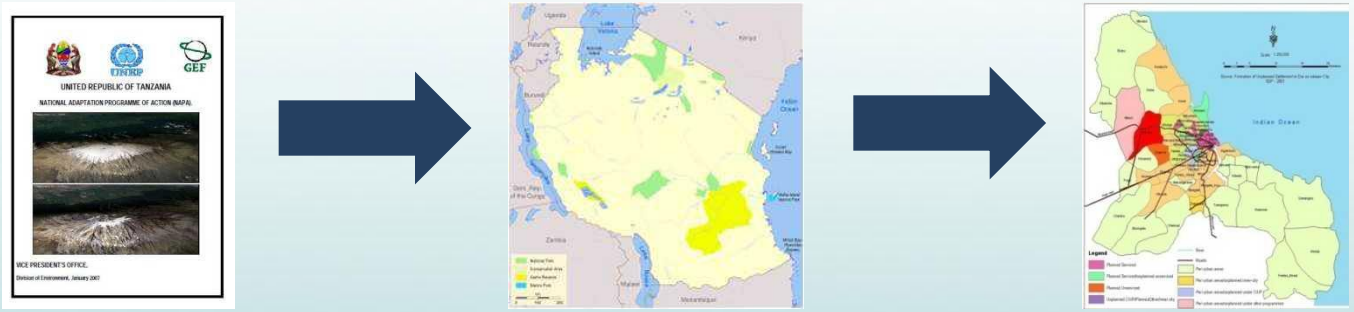
Source: Giuseppe Faldi, Sapienza University of Rome


Geological formations
Alluvional and river terraces
Raised coral reef limestones
White-buff sands
Clay-bound sands and gravels
Pugu-kaolinitic sandstones
Indian Ocean
N

Project's Objectives

Overall Objective

to contribute to the **implementation of** the National Adaptation Programme of Action (NAPA) of the URT (2007)



Action's Specific Objectives

- To improve the effectiveness of Dar municipality initiatives for supporting coastal peri-urban population in their effort to adapt to climate change

Thank you

Sapienza University of Rome
DICEA - Department of Civil, Building and Environmental Engineering
Via Eudossiana, 18 - 00184 Roma Tel. +390644585187 - Fax 0644585186
http://www.dicea.uniroma1.it/

Liana Ricci
liana.ricci@gmail.com