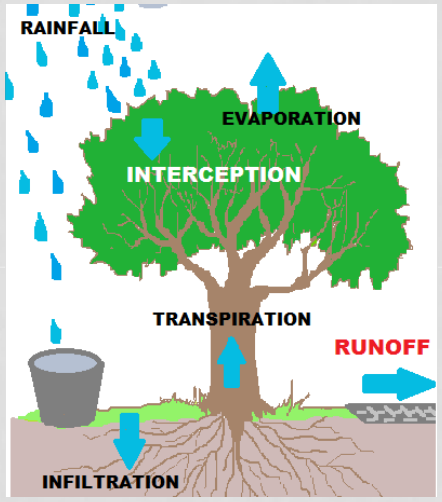
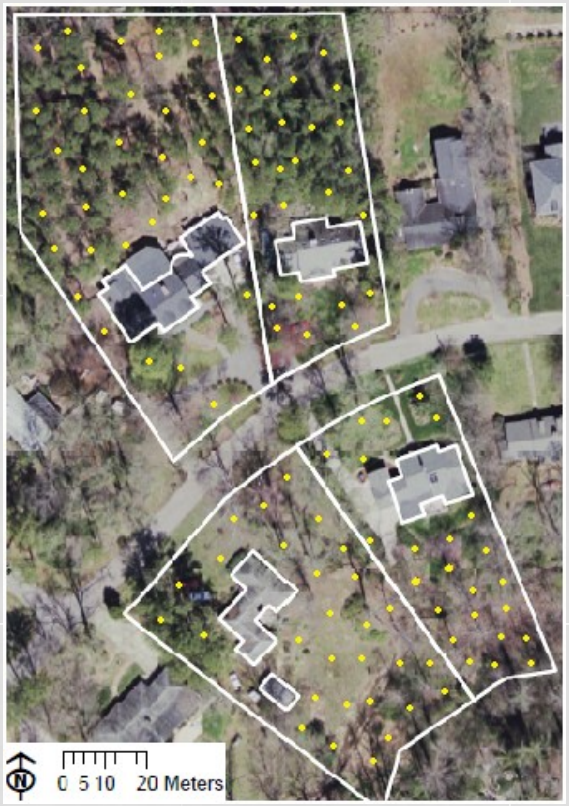



# RAINFALL INTERCEPTION BY TREES IN RESIDENTIAL NEIGHBORHOODS

ELINA INKILAINEN (MCHALE, JAMES, BLANK)

# A NEIGHBORHOOD COVERED IN BUCKETS

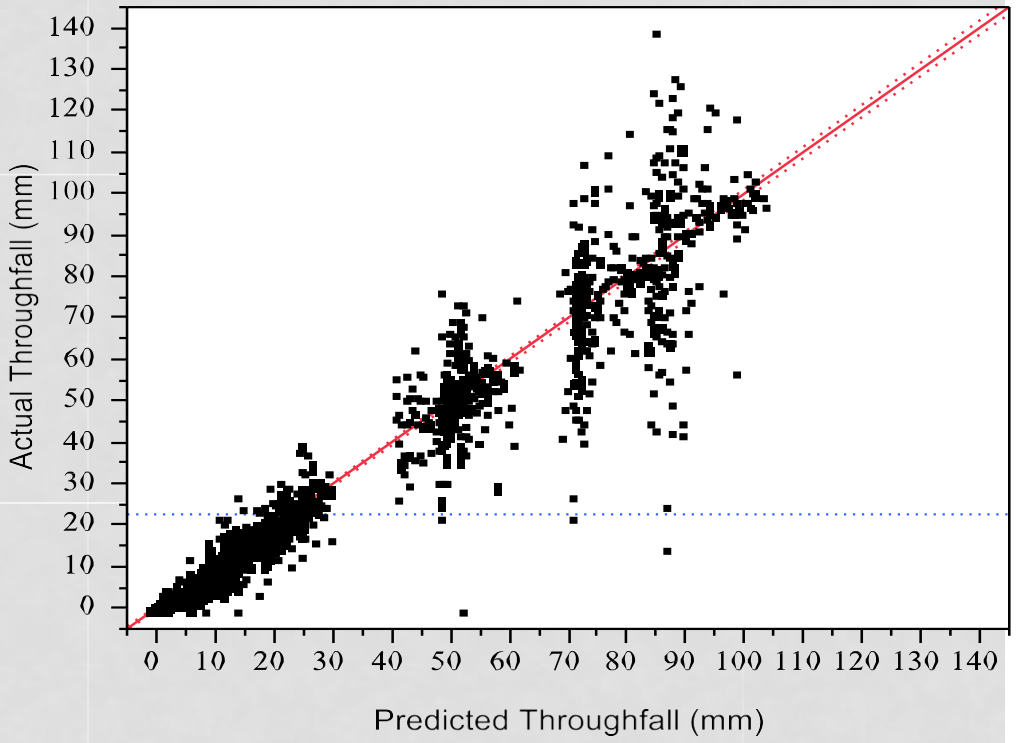



"Finally, one backyard has a dog that pees in my buckets - I love urban ecology. What is the average volume of pee a large dog produces in one day? Can you estimate the ratio of pee vs. rainwater from the color of the water??"

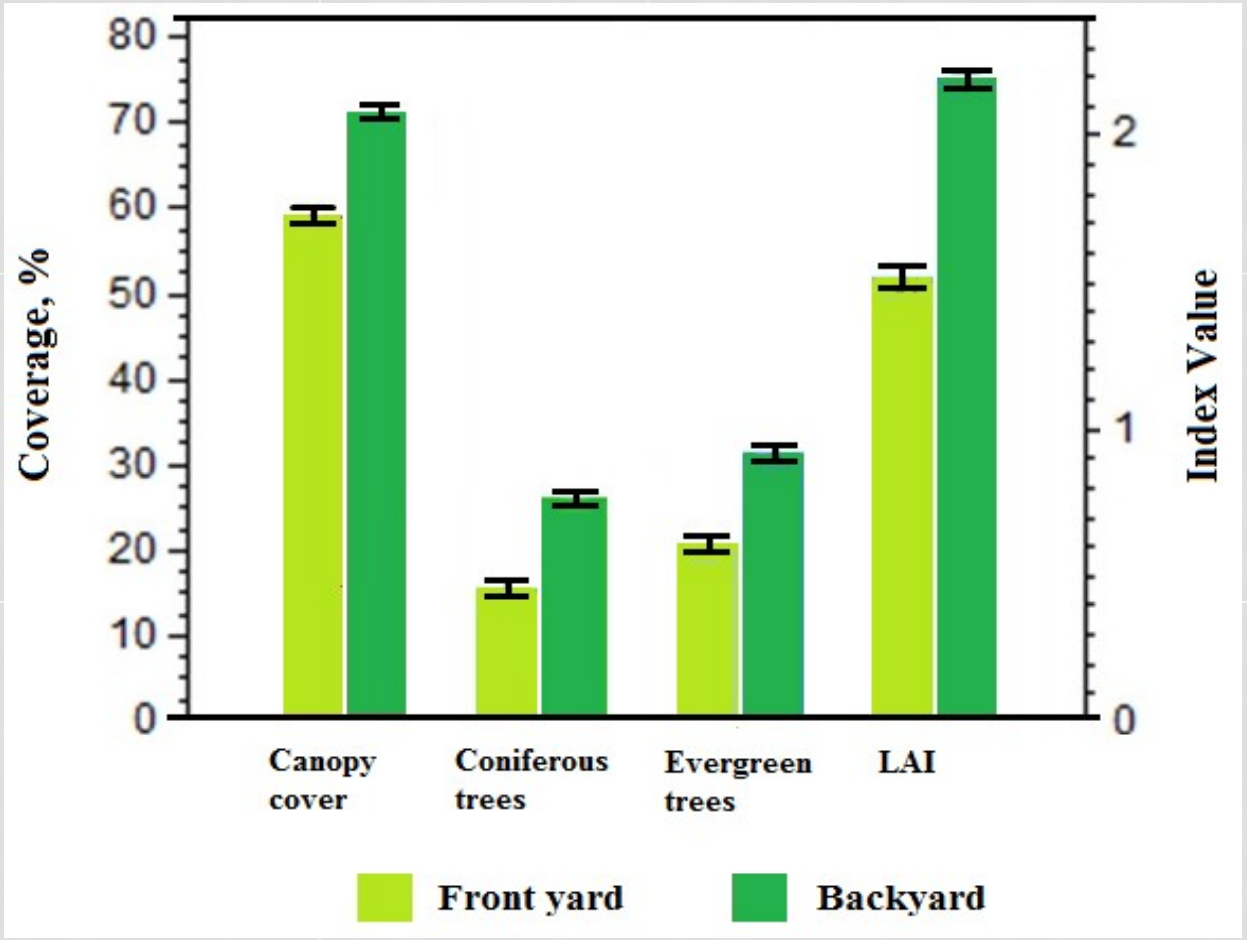
# RESULTS

- In this Urban Forest (66% tree cover) rainfall interception parallels that of rural forests

- Canopy cover and percent evergreen were the most important predictors (LAI failed)

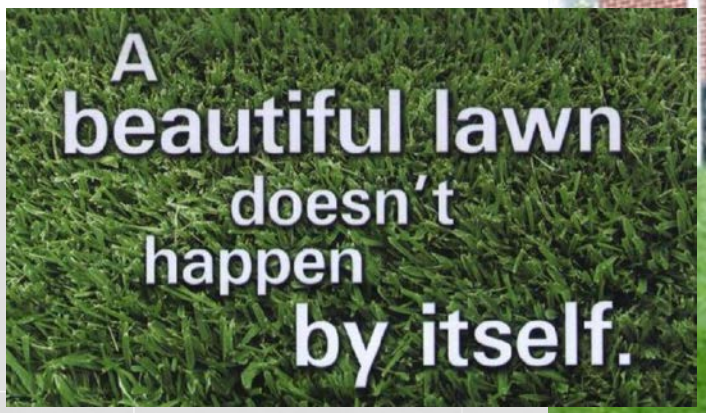


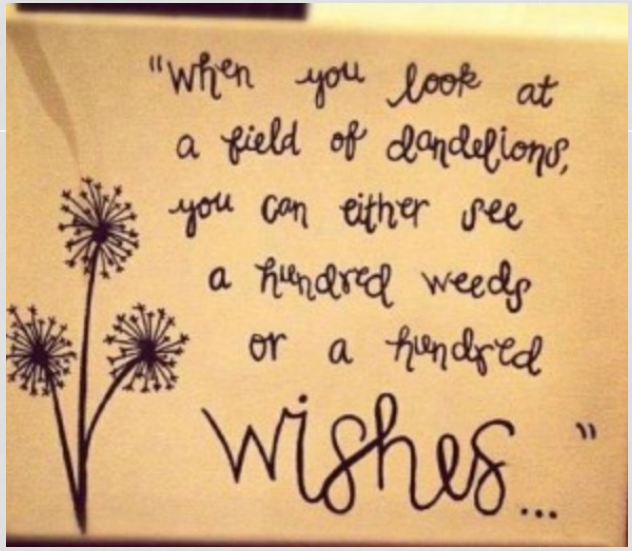
# AGAIN PEOPLE MATTER….



# LAWN EFFECTS

- Irrigation
- Fertilizers
- Herbicides
- Pesticides
- Mowing
- Lack of wildlife habitat




# INFLUENCES OF LANDSCAPE DESIGN AND LIFESTYLE CHOICES ON ENERGY USE

CARA NELSON (MCHALE, PETERSON)

**4 Socio-economic status groups**, Home energy use, Building characteristics, Air conditioner type and efficiency, Occupant(s) behaviors, Environmental attitudes, Demographics

# STANDARDIZED ENERGY RESULTS

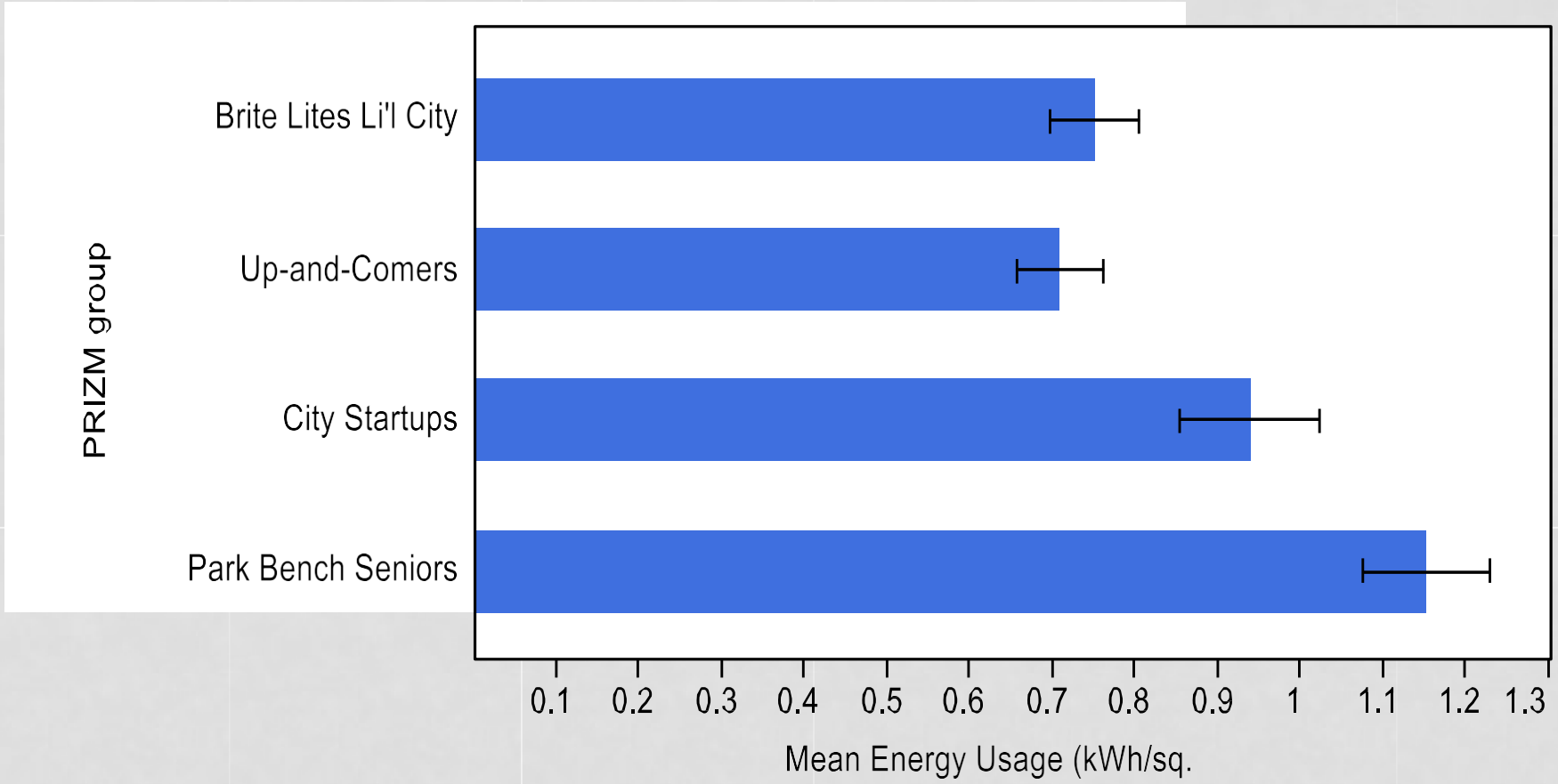
**Table 4:** Stepwise regression results for standardized energy use (energy use per square foot) in order of increasing R-square value (α=0.10). Dependent variable= kWh/month/sq. ft. This model explains 42.25% of the total variation. Percent tree cover within 18 m of the home was not significant in the model.

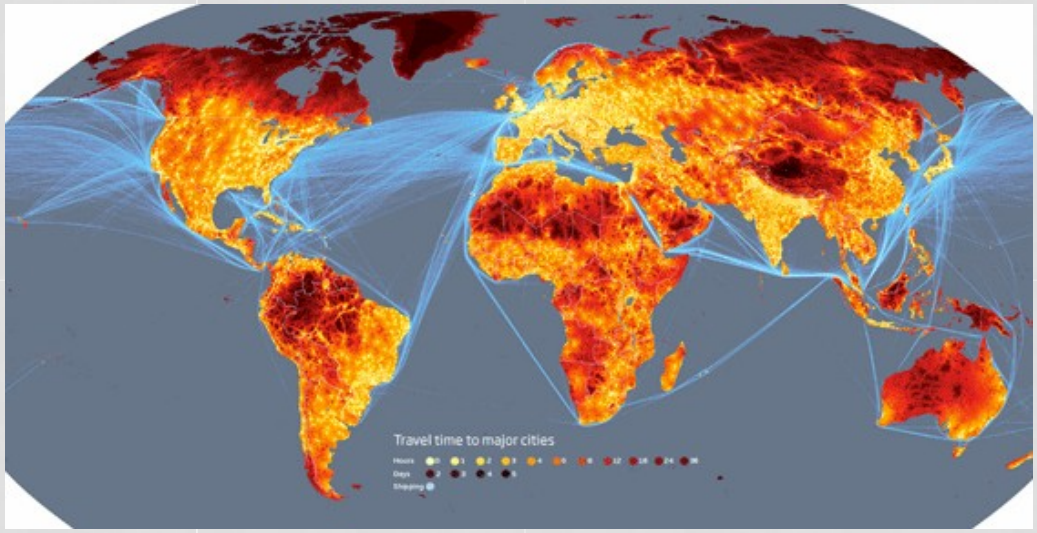
| Explanatory Variables | Coefficient | S.E.[a] | R-square | p-value |
|---|---|---|---|---|
| Intercept | 2.648 | 0.585 | --- | <0.0001 |
| Education level | -0.065 | 0.037 | 0.1608 | <0.0001 |
| Inside temperature | -0.024 | 0.007 | 0.2162 | 0.0006 |
| Home size | -0.0002 | 0.00004 | 0.2843 | <.0001 |
| Type AC unit | 0.417 | 0.106 | 0.3054 | 0.0238 |
| Number AC units | 0.147 | 0.058 | 0.3433 | 0.0020 |
| Home age | -0.003 | 0.001 | 0.3596 | 0.0400 |
| Home 18+ hours | 0.157 | 0.062 | 0.3741 | 0.0499 |
| Race | 0.153 | 0.090 | 0.3870 | 0.0624 |
| Comfort level | -0.138 | 0.067 | 0.4011 | 0.0500 |
| Number trees NW[b] | -0.031 | 0.015 | 0.4284 | 0.0834 |
| Percent cover 18 m | --- | --- | --- | >0.1500 |
| **Model R-square 0.4225** | | | | |

[a] S.E. =Standard Error

[b] Trees taller than 6 m and within 18 m of the home

# ENVIRONMENTAL JUSTICE ISSUES?



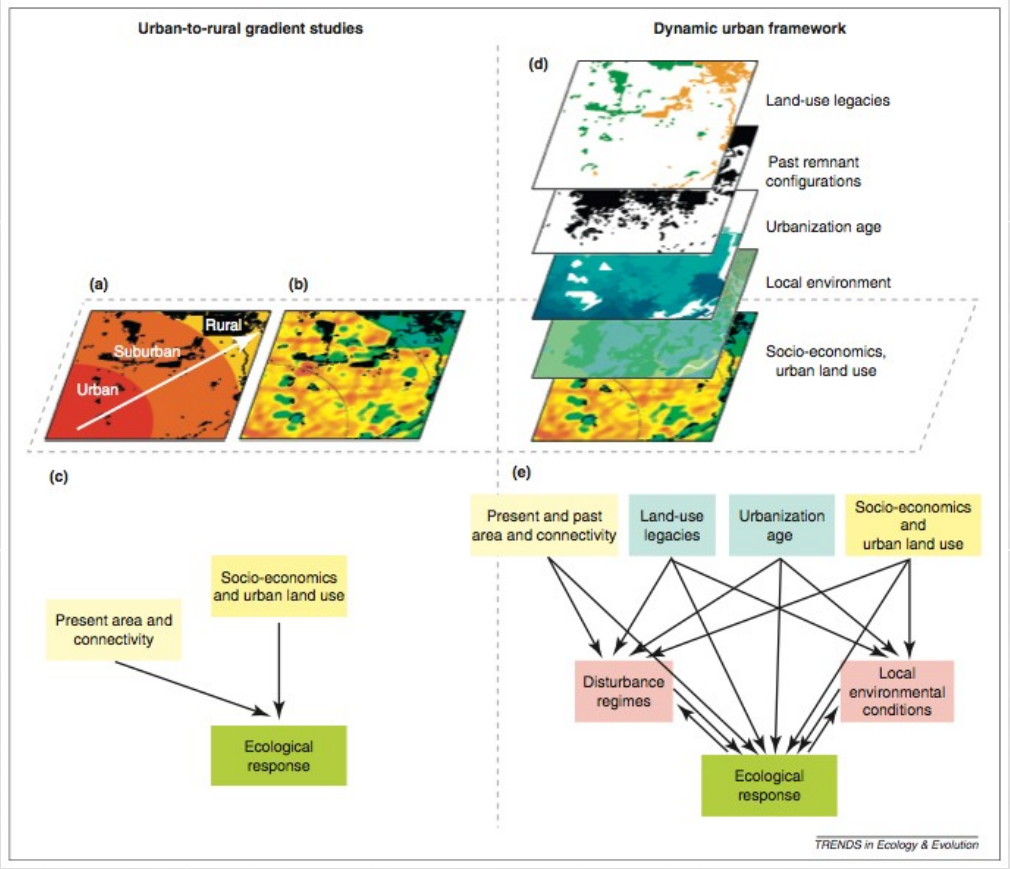



# URBAN ECOLOGY IN A DEVELOPING WORLD

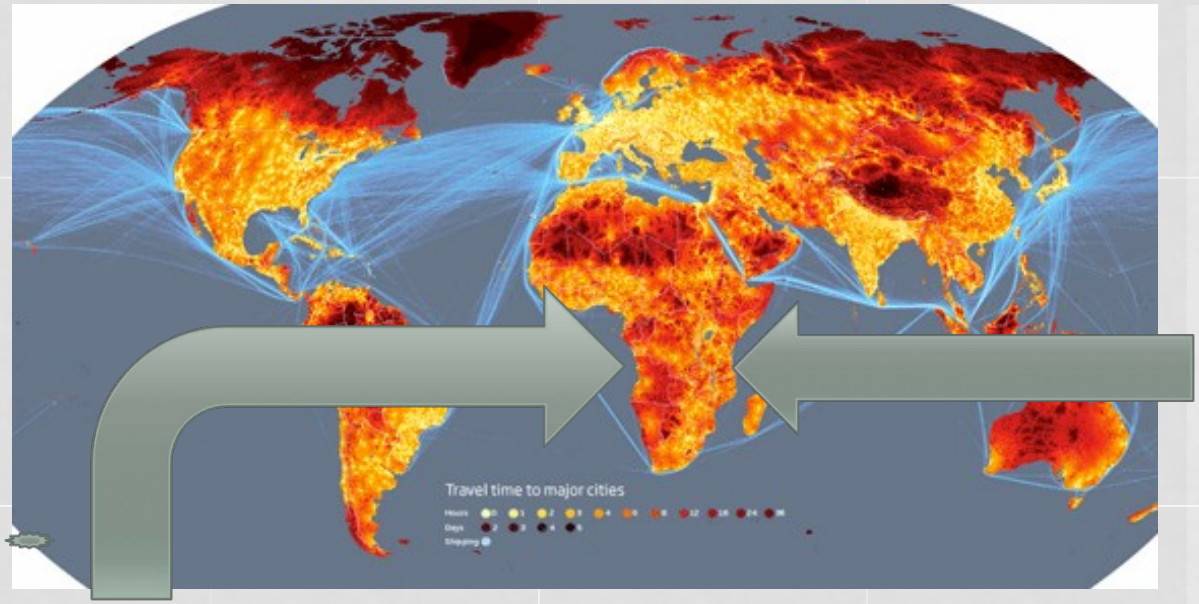
MCHALE, PICKETT, BUNN, TWINE

# URBANIZATION IS A PROCESS

- Drivers of Urbanization
- "The City" as the climax condition – western idea
- Study the urbanization process



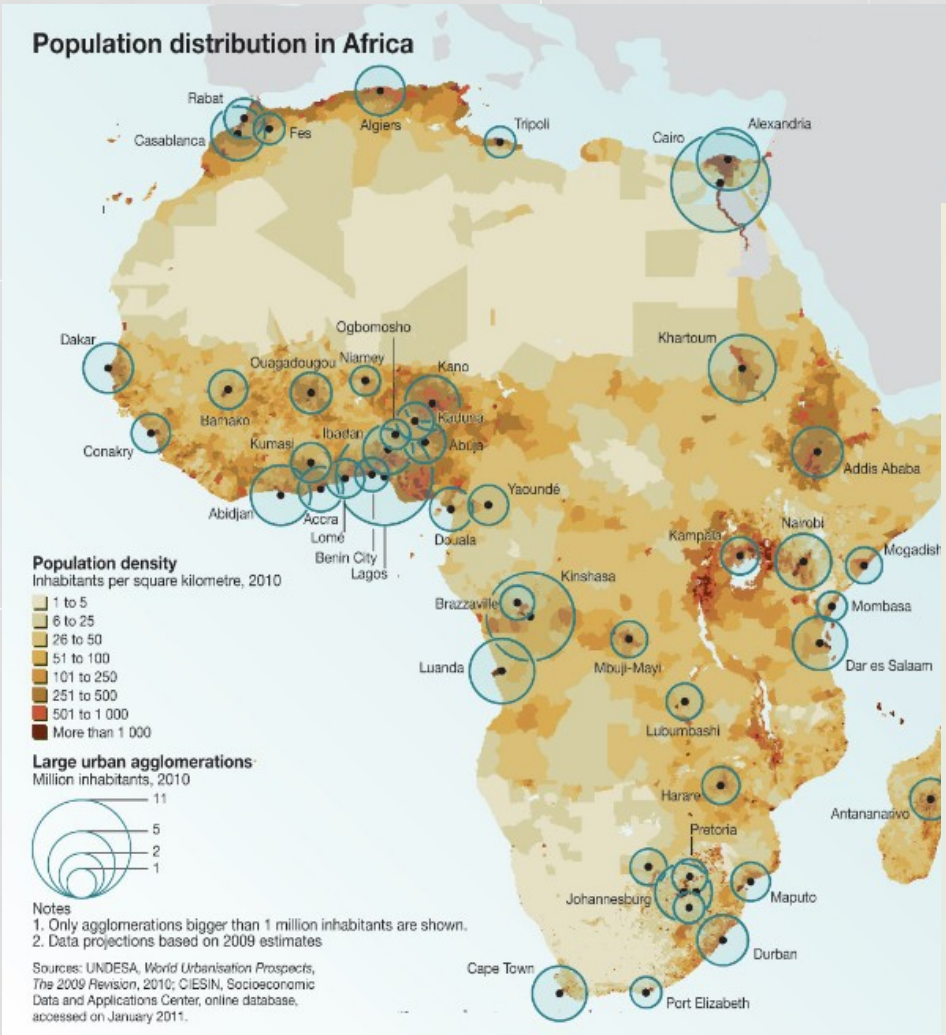
# URBANIZATION IN SUB-SAHARAN AFRICA

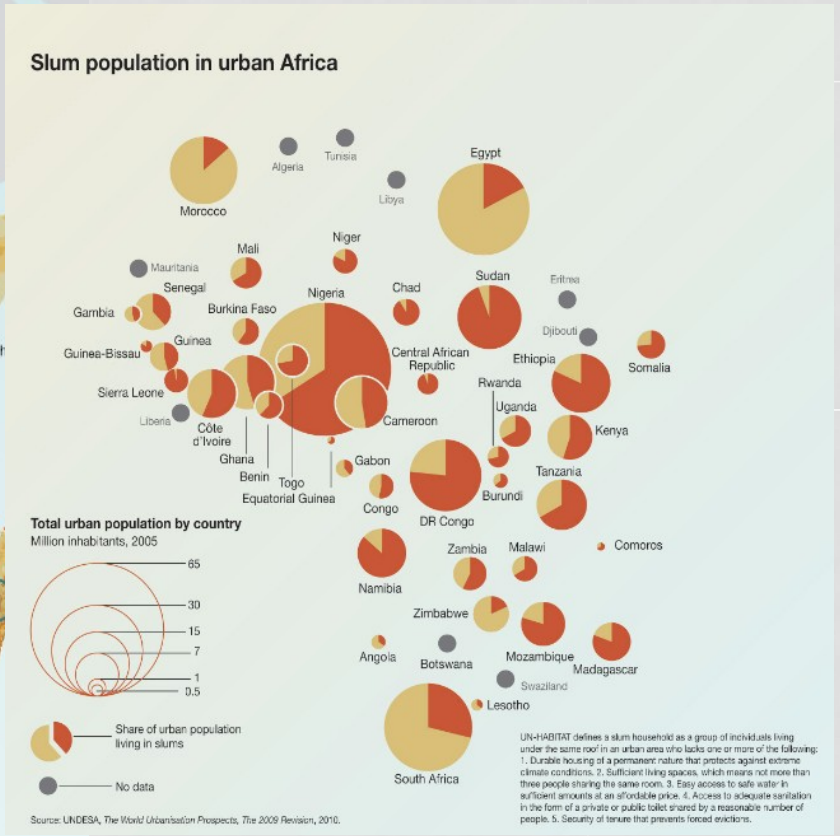



**12-Fold Increase in Urban Land Cover by 2050**

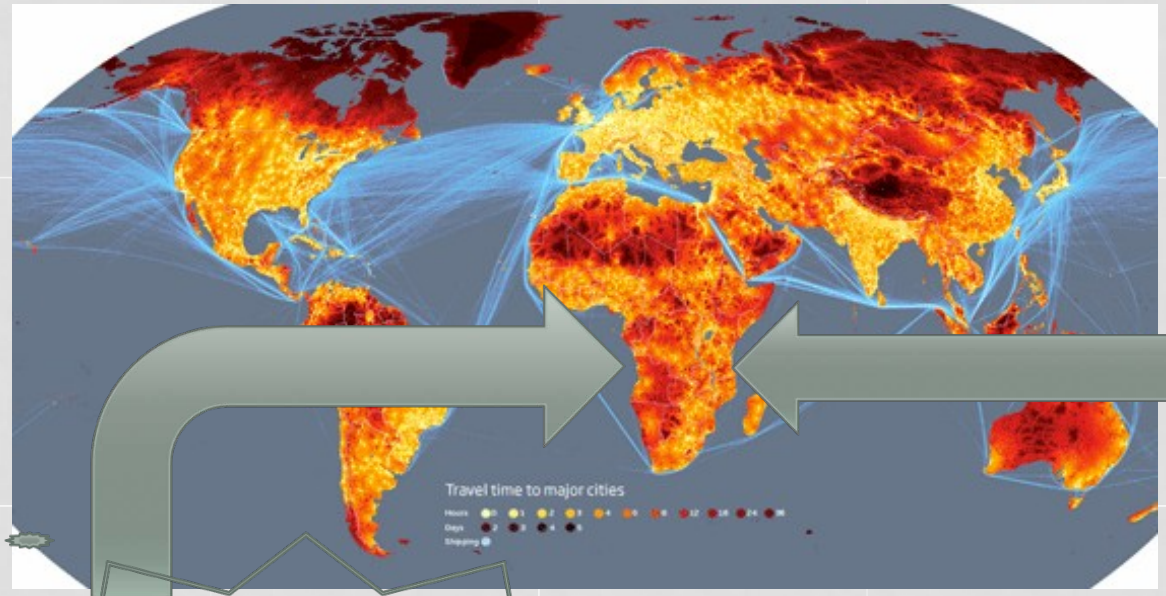
**By 2030 770 million Africans living in cities – more than the total # of city dwellers in the western hemisphere today**

# IS OUR CURRENT UNDERSTANDING OF URBANIZATION RELEVANT HERE?



# URBANIZATION IN SUB-SAHARAN AFRICA

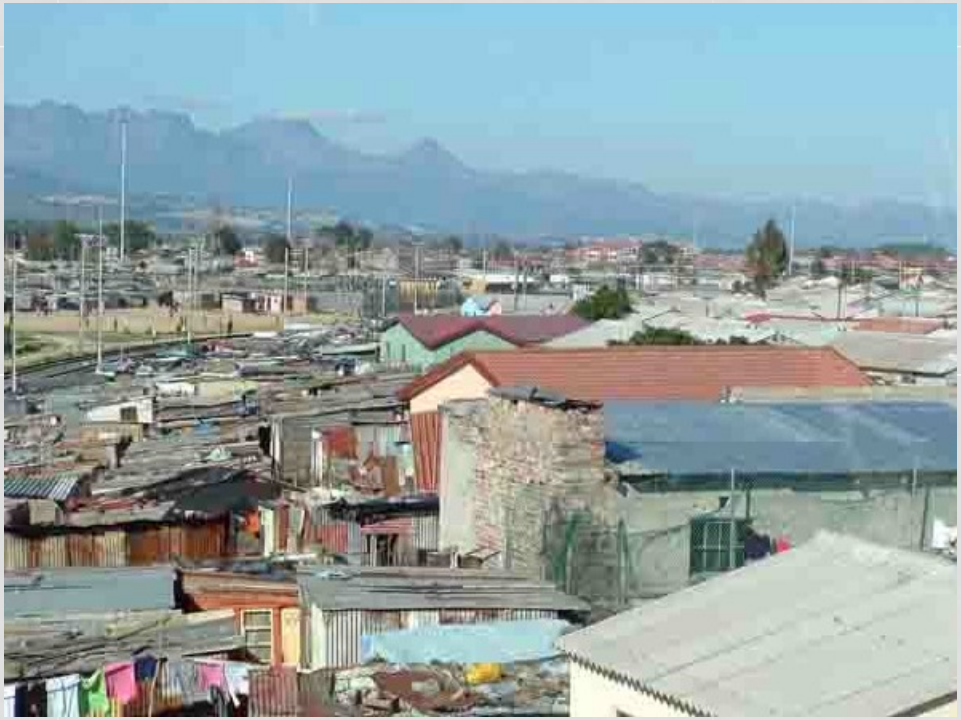



**By 2030**
**770 million Africans living in cities – more than the total # of city dwellers in the western hemisphere today**

**12-Fold Increase in Urban Land Cover by 2050**

# URBAN GROWTH IN AFRICA?

- Permanent migration to cities is decreasing
  (Ferguson 2007, Potts 2009)
- Urban population growth = high birth rates
  (Cohen 2004, Potts 2010)
- Urbanization = Reclassification of rural settlements (Potts 2012)
- Rural migration toward smaller towns and cities (Collinson et al. 2007)



# RURAL IS THE NEW URBAN

Low resource availability, poor services, little manufacturing, dependent on local natural areas, bustling centers of activity, informal economic production, high density of people

# THE URBAN GRADIENT / CONTINUUM

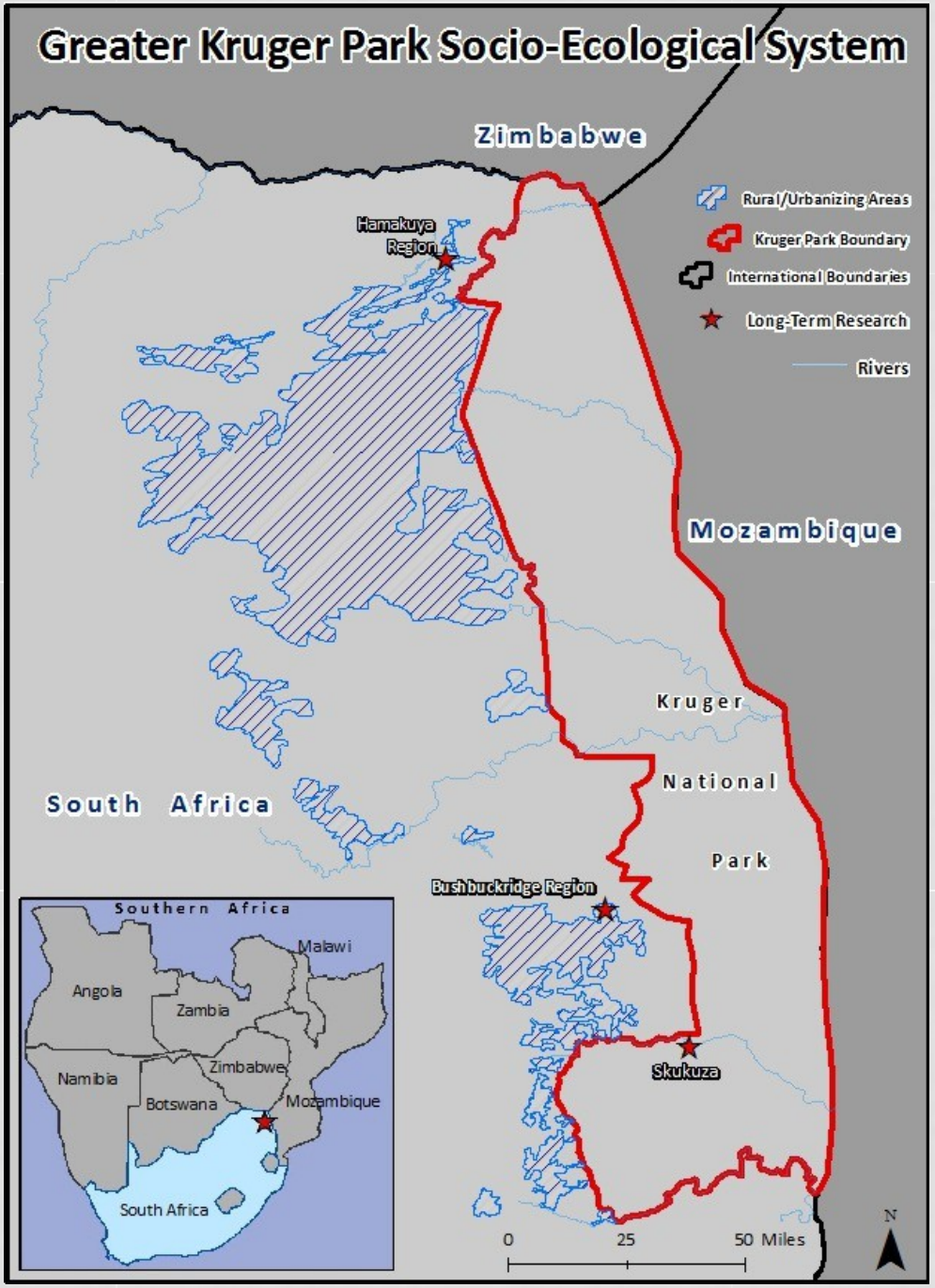
Urban/Rural "Connectivity" – Spatial or Temporal or Economic or ?

- Family and Kin relations
- Migration patterns

# SOUTH AFRICA – ENVIRONMENTAL JUSTICE AND CONSERVATION

- Challenges- Unemployment, Extreme rural poverty, Political corruption, Xenophobic violence, HIV/aids, post apartheid legacies

- Advantages – large economy, progressive constitution, heterogeneous and diverse, kruger national park, urbanizing populations



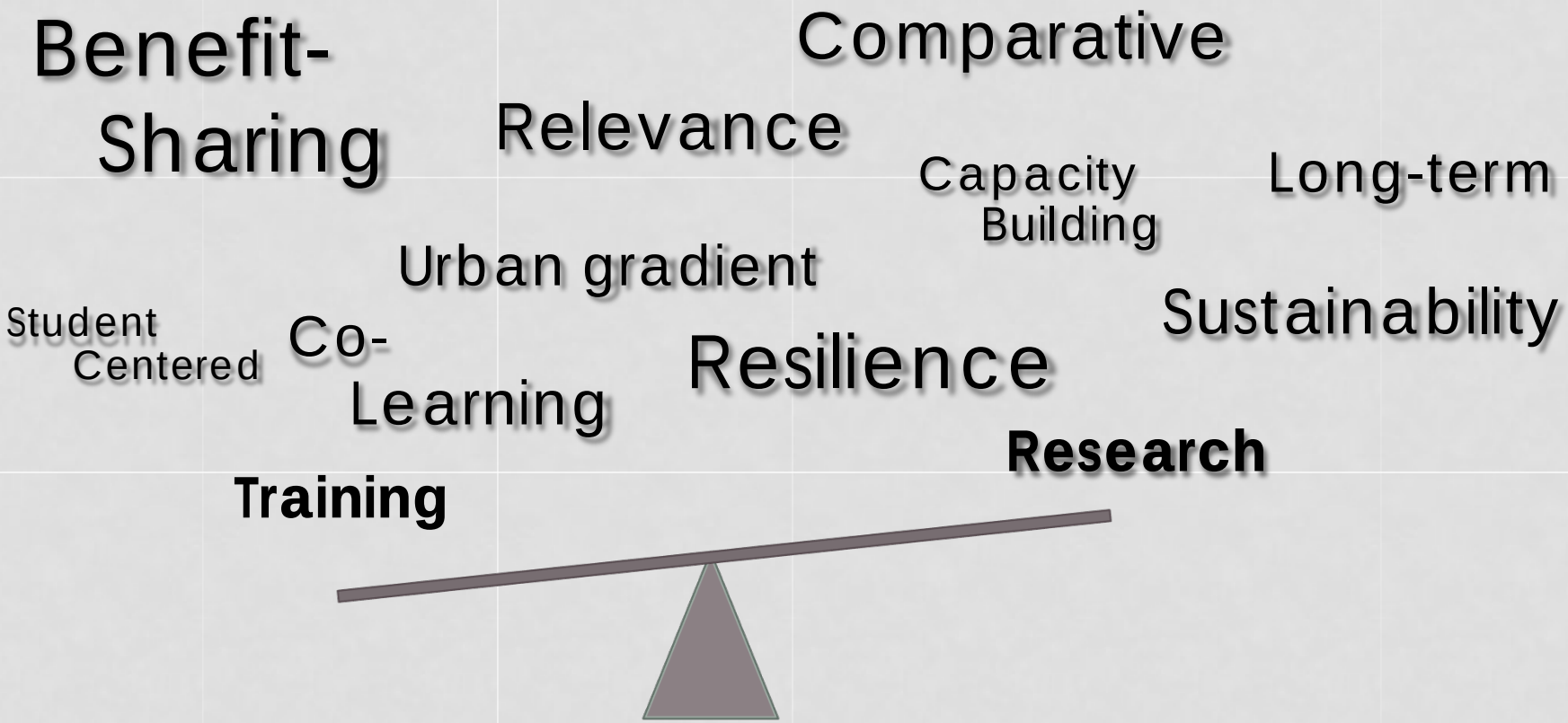


# THE IMAGINE PROGRAM

DEVELOPING SCIENCE FOR THE WELL-BEING OF COMMUNITIES IN-NEED

http://urbanecologylab.wikispaces.com/IMAGINE

# INTERNATIONAL GRADUATE TRAINING AND LONG-TERM SOCIO-ECOLOGICAL RESEARCH?

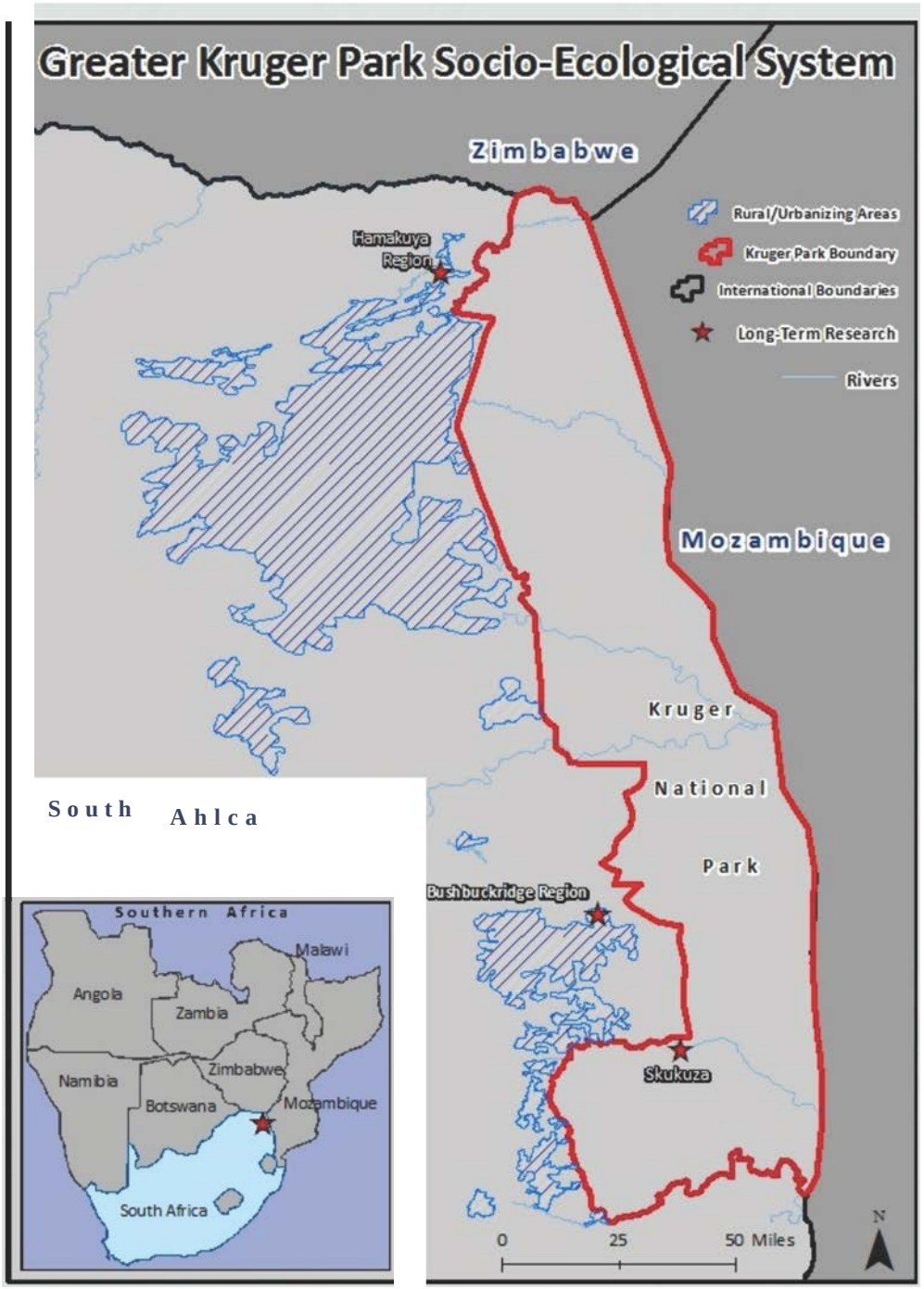


# IMAGINE – OUR MISSION FOR A LTSER PROGRAM

To establish a **trans-disciplinary research** and **education** program that contributes to the **sustainability** and **resilience** of the greater Kruger National Park **socio-ecological system**.

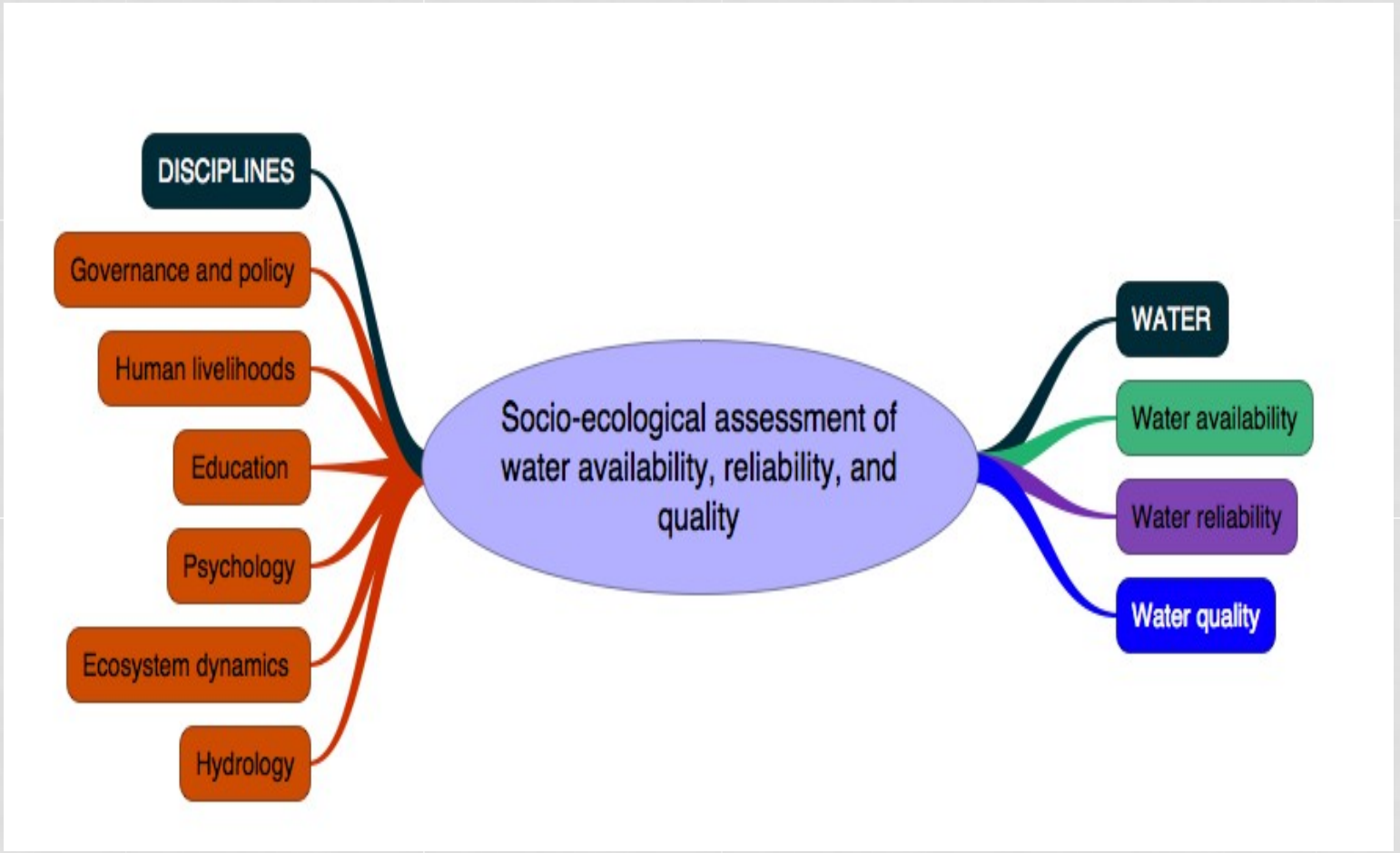
Through **co-learning** and **benefit- sharing** we will develop research that enhances the **well-being** of people living in the region.

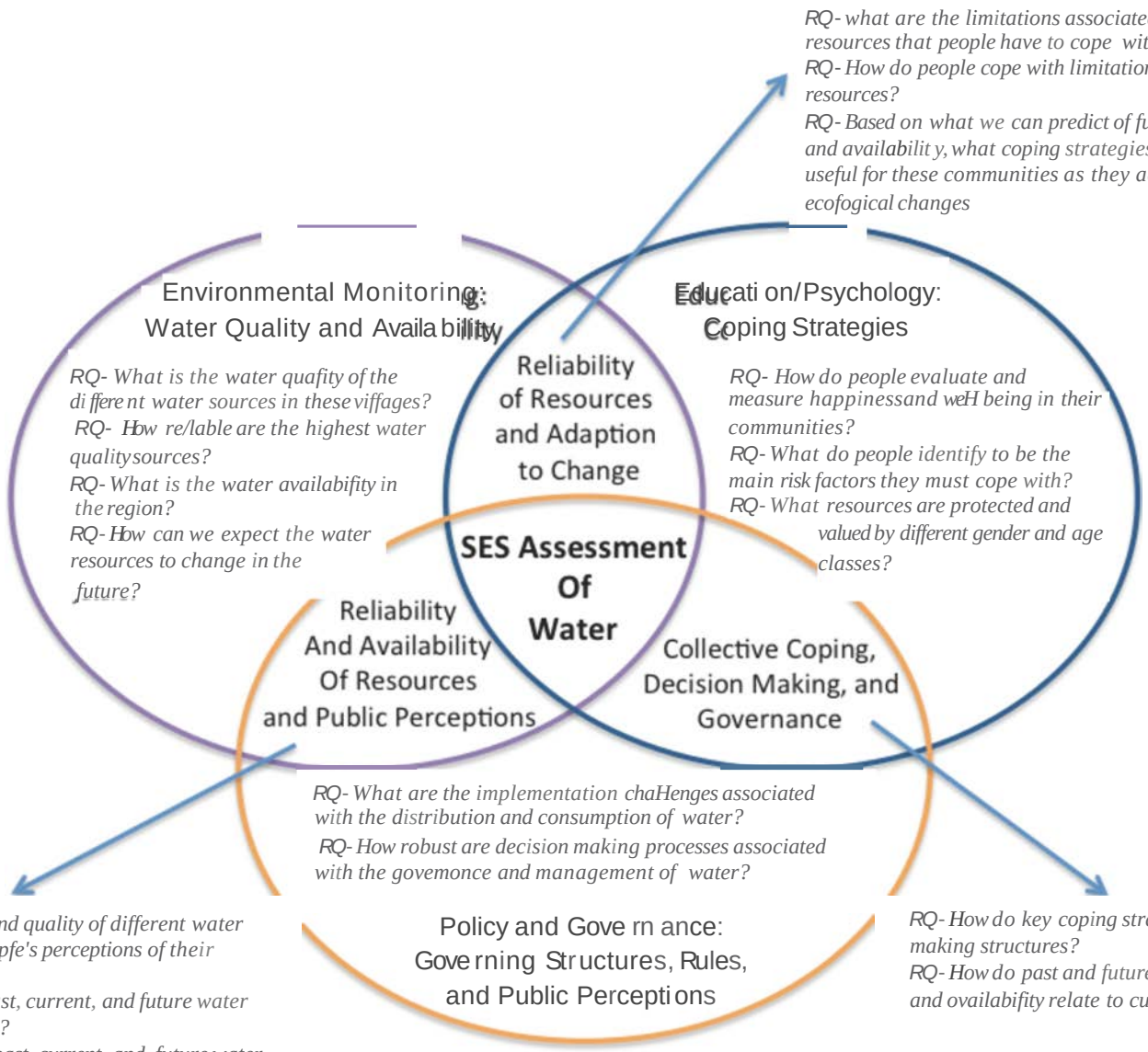
Our **collaborative** research network will expand **comparative** understanding of complex socio-ecological systems located along a **rural-urban** gradient.


Greater Kruger Park Socio-Ecological System
Zimbabwe
Rural/Urbanizing Areas
Kruger Park Boundary
International Boundaries
Long-Term Research
Rivers
Hamakuya Region
Mozambique
Kruger
National
Park
South Ahlca
Bushbuckridge Region
Skukuza
Southern Africa
Malawi
Angola
Zambia
Zimbabwe
Namibia
Botswana
Mozambique
South Africa
0
25
50 Miles
N

# 2012 IMAGINE RESEARCH TEAM

# INTERDISCIPLINARY APPROACH




RQ- what are the limitations associated with water resources that people have to cope with?
RQ- How do people cope with limitations on their water resources?
RQ- Based on what we can predict of future water quality and availability, what coping strategies will be the most useful for these communities as they adapt to socio ecofogical changes
Environmental Monitoring: Water Quality and Availability
Education/Psychology: Coping Strategies
Reliability of Resources and Adaption to Change
SES Assessment Of Water
Reliability And Availability Of Resources and Public Perceptions
Collective Coping, Decision Making, and Governance
Policy and Governance: Governing Structures, Rules, and Public Perceptions
RQ- What is the water quafity of the different water sources in these viffages?
RQ- How re/lable are the highest water quality sources?
RQ- What is the water availabifity in the region?
RQ- How can we expect the water resources to change in the future?
RQ- How do people evaluate and measure happiness and weH being in their communities?
RQ- What do people identify to be the main risk factors they must cope with?
RQ- What resources are protected and valued by different gender and age classes?
RQ- What are the implementation chaHenges associated with the distribution and consumption of water?
RQ- How robust are decision making processes associated with the govemonce and management of water?
RQ- How does the refiabifity and quality of different water sources overfap to inform peopfe's perceptions of their current water supply?
RQ- How do perceptions of past, current, and future water quafity align with actuaf data?
RQ- How do perceptions of past, current, and future water avai fabifit y align with actuaf data?
RQ- How do key coping strategies afign with de cision making structures?
RQ- How do past and future perceptions of water quality and ovailabifity relate to current coping strategies?

NC STATE UNIVERSITY

# SOUTH AFRICA Summer 2015

## Water Woes: People, Parks, and Pollution

Designed for undergraduate and graduate students interested in sustainability, environmental technology, conservation, public health, environmental justice, policy, planning, and urbanization - participants will explore and gain a more nuanced understanding of how conservation areas and communities struggle to find balance in maintaining ecosystem health and integrity with human health and well-being. In one of the world's most biodiverse areas, Kuger National Park, this experience will allow participants to engage with the wonders of the savanna in a meaningful way while developing the expertise needed to become successful sustainability scientists and practitioners.

## Program Dates:

May 17 - June 7, 2015

## Cost:

$4,100

Cost includes: non-refundable application charge, tuition, housing & meals, inti health insurance, field work & park entrance fees.

Airfare *not* included.

## Courses:

Participants will enroll in one of the following courses for a total of 6 credits.

- NR 595 Socio-Ecological Research Methods
- ET 495
- ADN 495 Art and Design International Studio: Documentary Digital Film
- LAR 565 International Landscape Architecture Design Studio

## Application Deadline: February 15

Applications will be reviewed on a rolling basis.

## Apply at studyabroad.ncsu.edu

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**Program Contact Information:**

Dr. Melissa McHale
Dept of Forestry
mrmchale@ncsu.edu

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http://urbanecologylab.wikispaces.com/2015+How+to+Apply

QUESTIONS?

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