

# Geoinformation for Sustainable Urban Management

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# Outline

- Definitions
  - Geospatial technologies
  - Urbanization problem
- Previous Collaboration
- Case Studies
  - Amman, Jordan - Water Authority
  - South Sudan - Participatory Town Planning
- Capacity Building
- Future Activities

# Geospatial Technologies

- Synergy of these different information technologies:
  - Remote Sensing
  - Geographic Information Systems (GIS)
  - Global Positioning Systems (GPS)
  - Web Mapping and Web GIS tools
- Used to capture, process, and analyze data that is **georeferenced**
- Information derived from this data becomes powerful decision support tools for **problem solving, visualization, and communication**

# The Urbanization Challenge

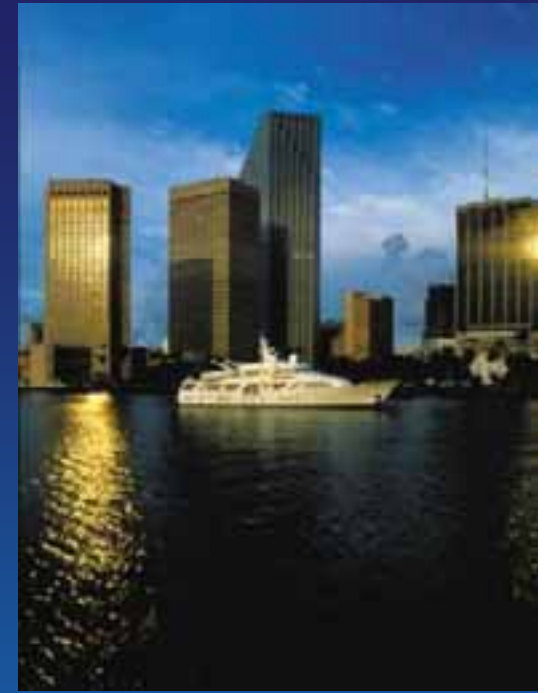
- Mid-range population estimates predict the world will go from **6.5 billion in 2005** to **9.1 billion in 2050**.
- **Most of this growth will occur in new or existing cities in the developing world.**
- Half the infrastructure needed by 2050 will have to be built by some of the **poorest countries** in the world.
- This is equivalent to building **a new city of 1 million inhabitants every week** for the next 40 years!



Source: David Rain, GWU

# The Urbanization Challenge

- By 2025:
  - more than 60% of the world's population will live in urban areas
- Lack of access to basic infrastructure exacerbates:
  - environmental degradation
  - political unrest/instability
  - ...turning fragile states into failed states



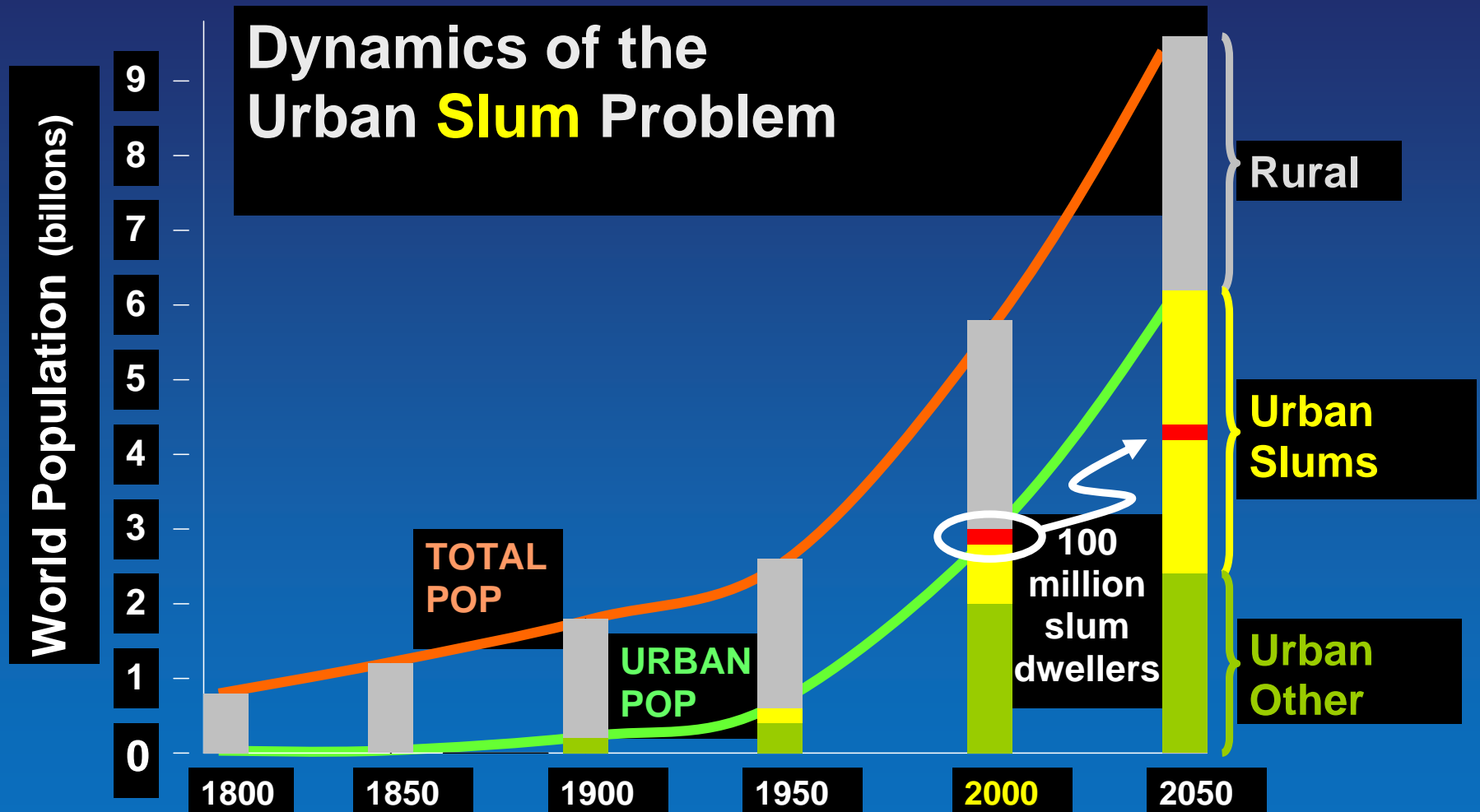
# Urbanization of Poverty

- Proliferation of Slums
- as of 2005, there were 1 billion squatters in the world - **1 in 6 people on earth**
- by 2030, there will likely be 2 billion squatters- **1 in 4 people on earth**



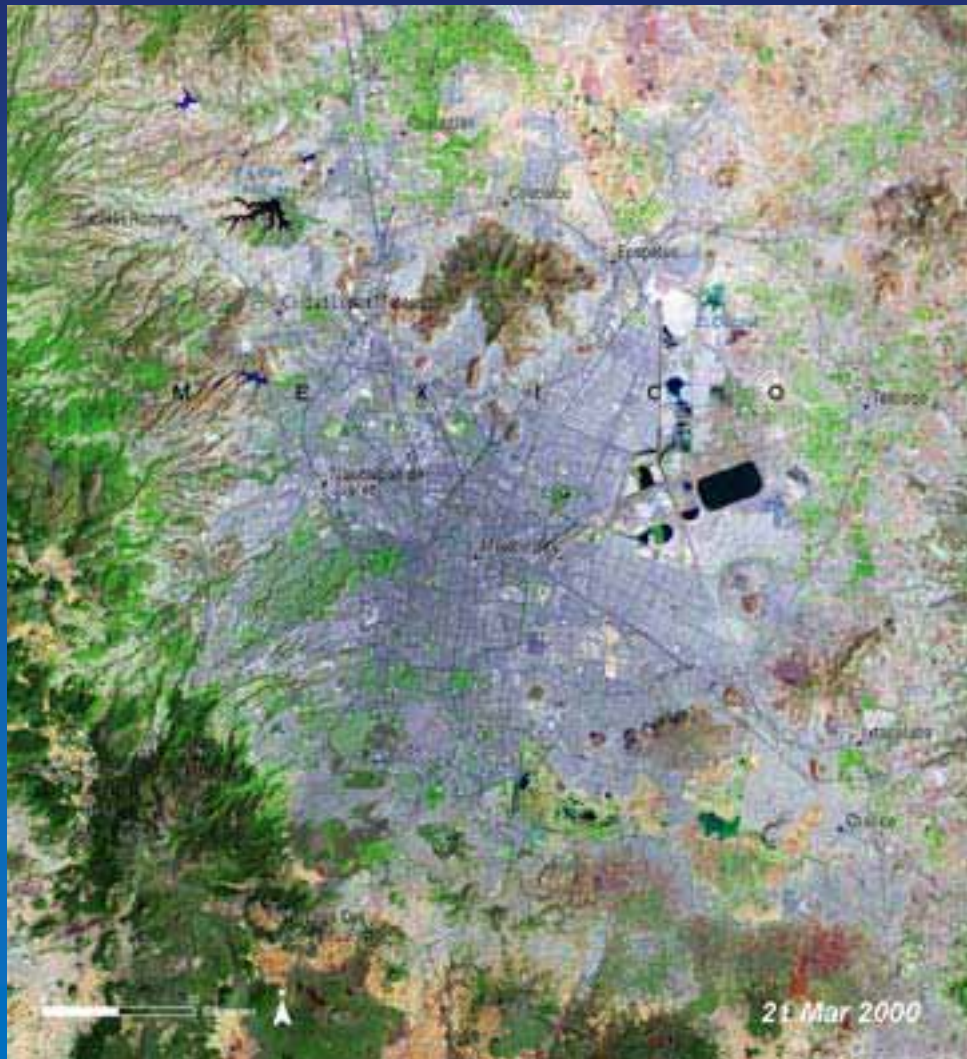
SOURCE: R. Neuwirth: *Shadow Cities: A billion squatters*,  
Routledge, 2005

# Urbanization of Poverty



SOURCE: United Nations - HABITAT, 2005

# Mexico City: Growth of a Megacity



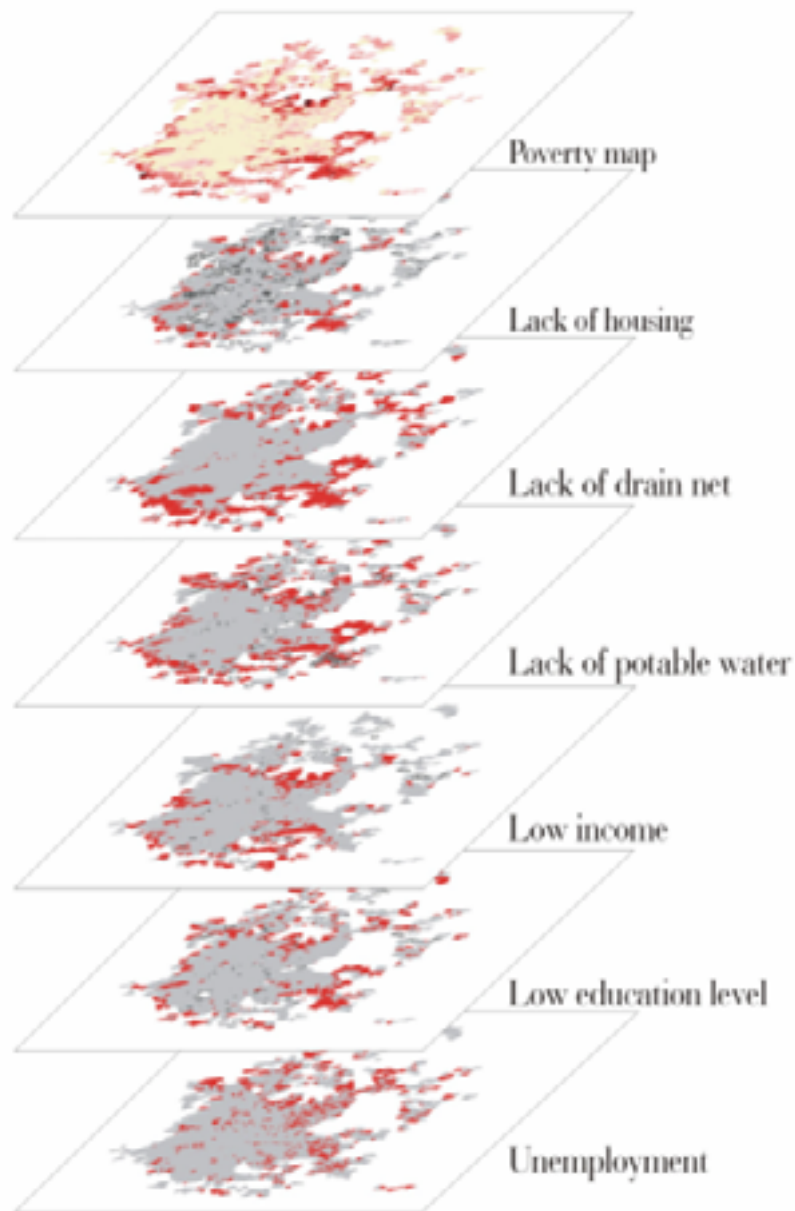
- **1973** - Urban growth is concentrated in the center of the city
- **2000** - Now expands dramatically into surrounding rural areas



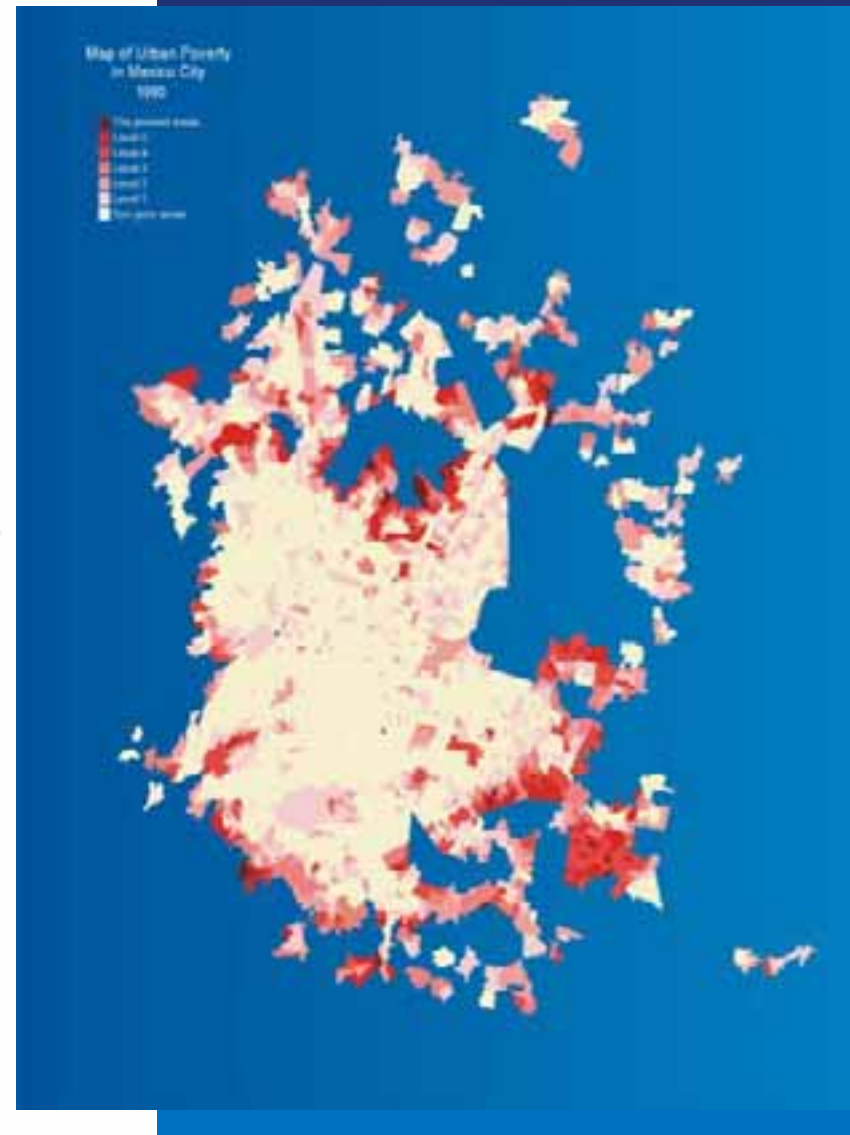
Source: UNEP One Planet, Many People: Atlas of our Changing Environment



## Overlay analysis of Urban Poverty in Mexico City

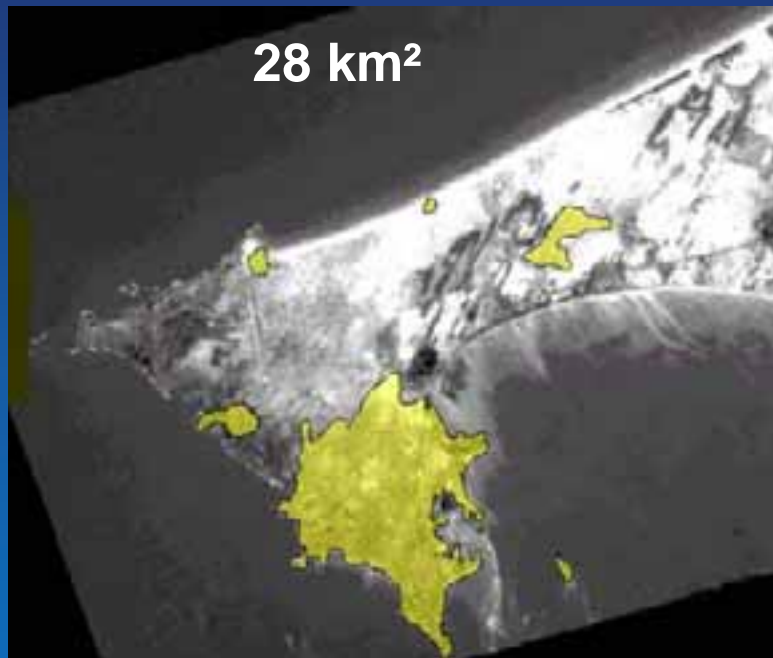


# Urban Poverty - Mexico City

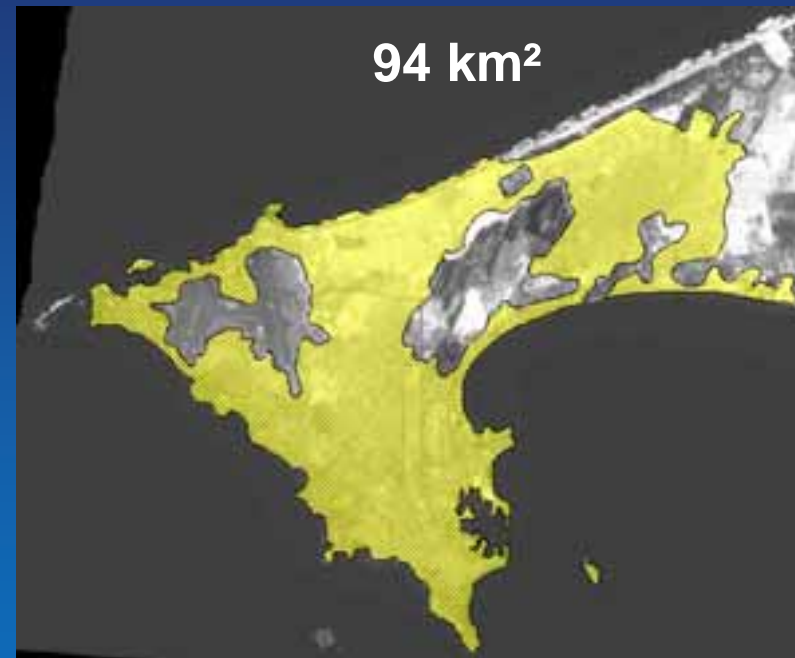


# Population and Urban Growth in Dakar

Corona 1966



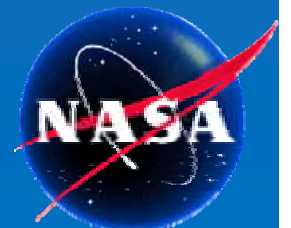
Landsat 1997



0 Kilometers 10



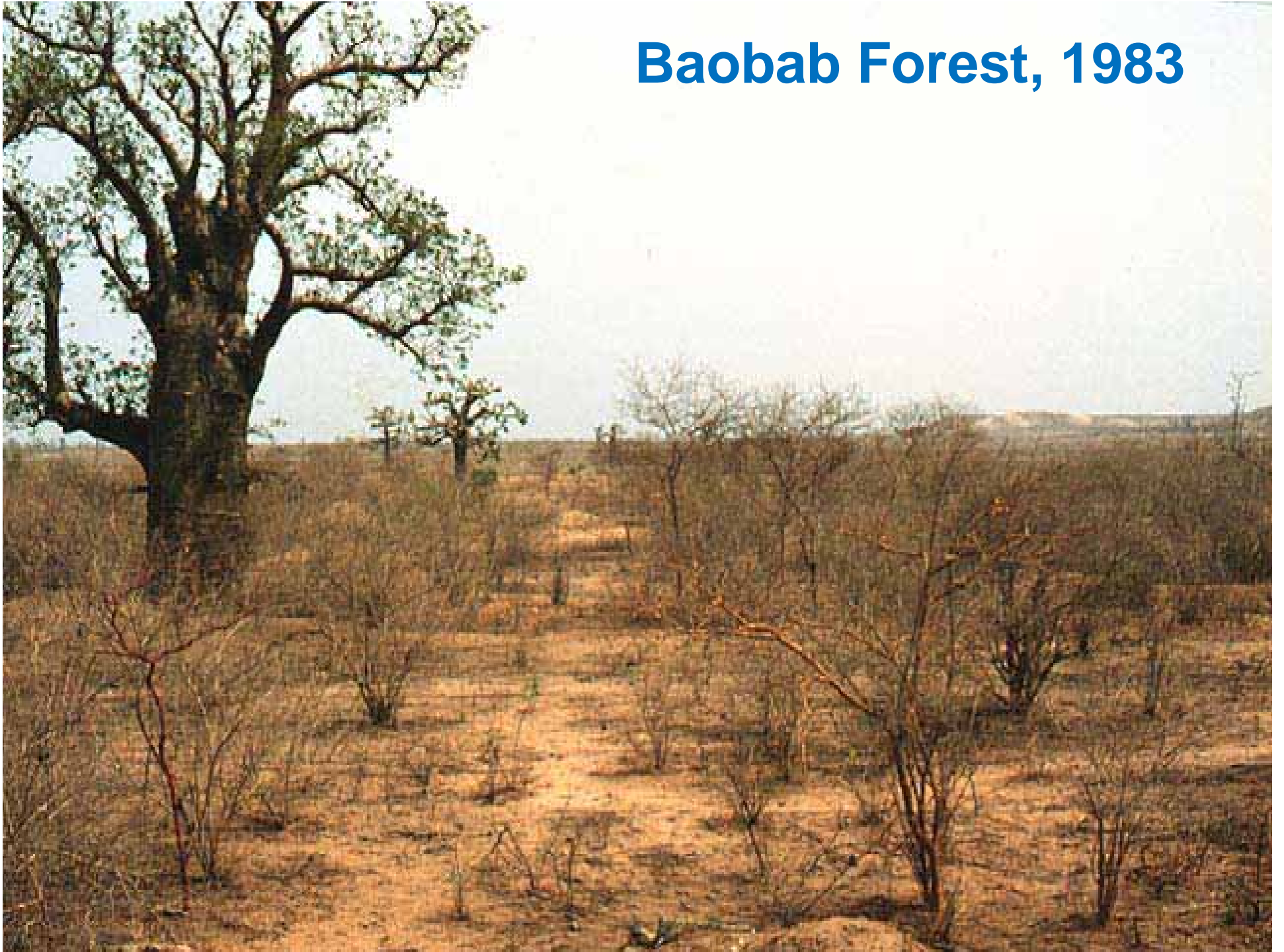
SOURCE: USGS/EDC, Gray Tappan



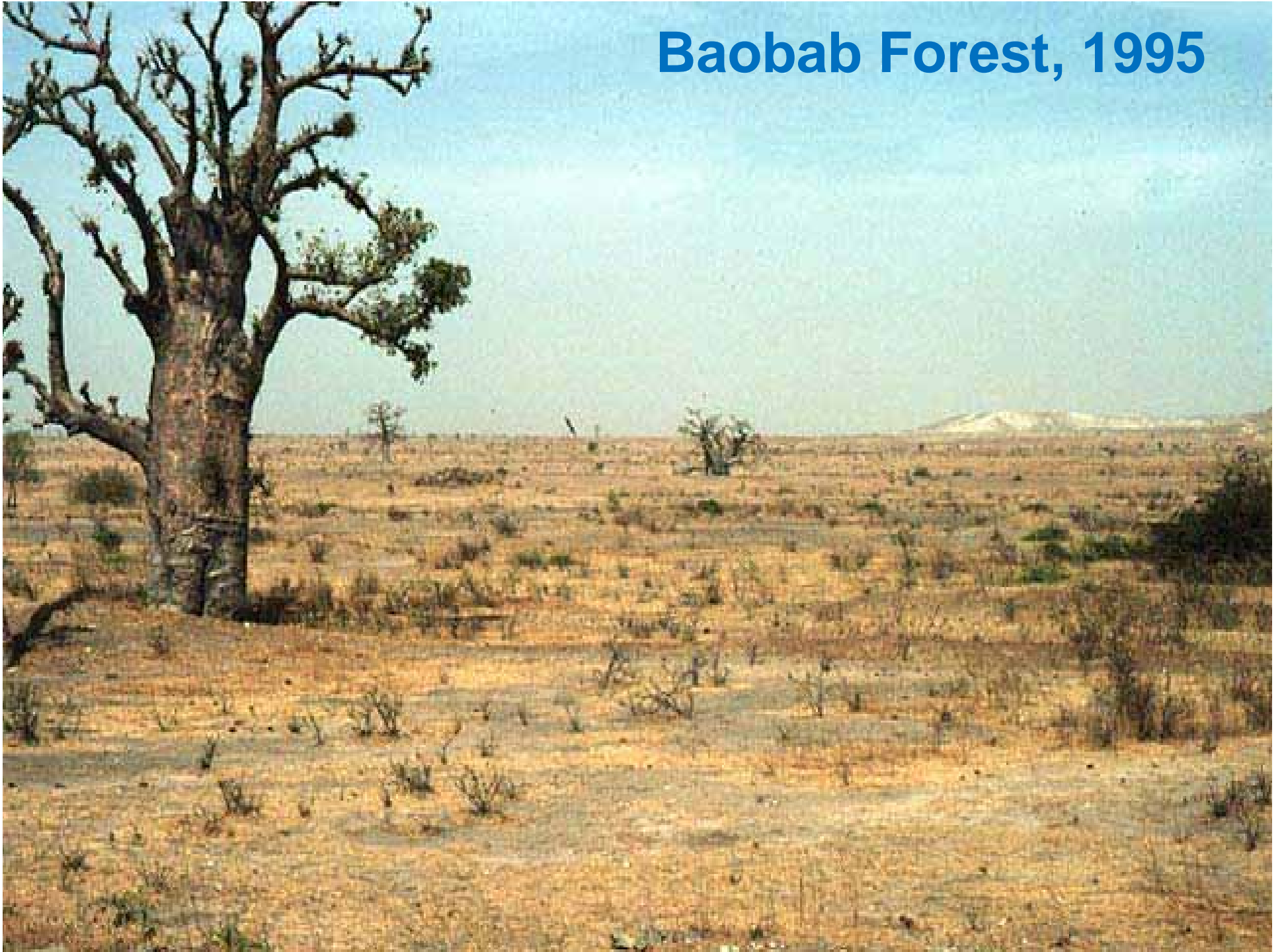
# Protected Baobab Forest Dakar, Senegal



## Baobab Forest, 1983



## Baobab Forest, 1995



# GeoInformation for Sustainable Cities Workshop

July 2006 in Amman, Jordan

[www.icma.org/internationalgis](http://www.icma.org/internationalgis)





## Theme:

Harnessing the power of *geospatial sciences & technologies* (the synergy of earth observation, GIS, GPS, web-based mapping tools) to improve the efficiency of urban infrastructure services: water, energy, transportation, sanitation, planning, slum rehabilitation, health, poverty reduction, etc.

# A Public Private Partnership

- US Department of State
- US Department of Housing and Urban Development
- US Agency for International Development
- ESRI
- Trimble
- International City/County Management Association
- with participation from UN HABITAT, Arab Town Org, etc.





# Workshop Summary

- 50 urban planners, scholars, geospatial technologists, and decision makers
- 10 countries in the MENA region: Morocco, Tunisia, Egypt, Libya, West Bank-Gaza, Jordan, UAE, Iraq, Kuwait, Yemen
- 15 women
- 3 days of training in ESRI and Trimble technology
- 2-days of policy discussions and presentations



Image courtesy of AT Sistemas – Rosario C. Giusti de Perez

# Workshop Outcomes (1) :

- Capacity building through:
  - Training/lectures on GIS and GPS by ESRI and Trimble
  - 2-days of policy discussions
- Dissemination of information:
  - Resources DVD
  - Latest literature from ESRI Press and Trimble
  - Website: [www.icma.org/internationalGIS](http://www.icma.org/internationalGIS)
  - Introduced the concept of Spatial Data Infrastructures (SDIs)
- Discussion on potential funding sources



Source: UN HABITAT

## Workshop Outcomes (2) :

- Building of geoinformation networks
- Abu Dhabi Environmental Agency & ATO offered to host the next meeting as well as the website
- Considerable post-event coverage:
  - 3 newspaper articles (Jordan Times)
  - 1 radio interview in Amman
  - 2 State Department on-line articles in six languages
  - 1 AAAS on-line and 1 in SCIENCE (Oct. 7, '06) issue.



Source: UN HABITAT







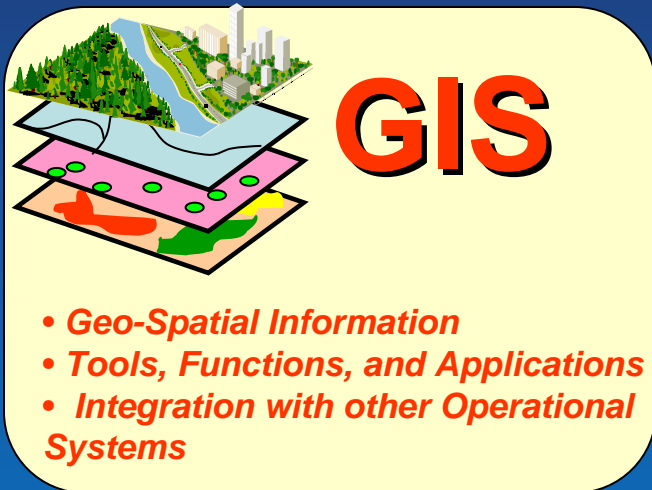


# Case Study:

Amman, Jordan - Water Authority



# GIS use by the Amman, Jordan Water Authority



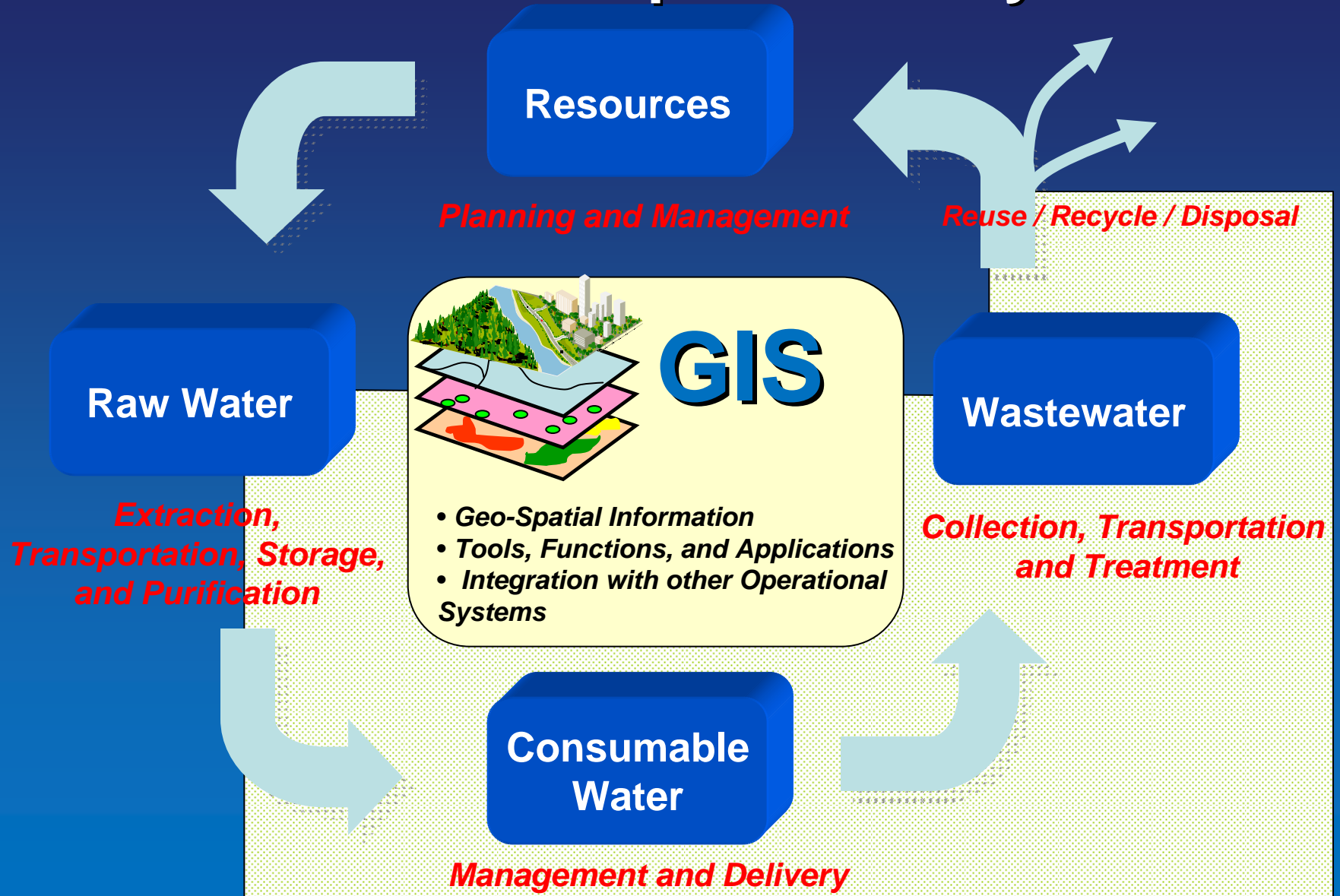
**GIS**

- *Geo-Spatial Information*
- *Tools, Functions, and Applications*
- *Integration with other Operational Systems*

Nidal Saliba, GIS Manager  
the Water Authority of Jordan,  
Ministry of Water & Irrigation



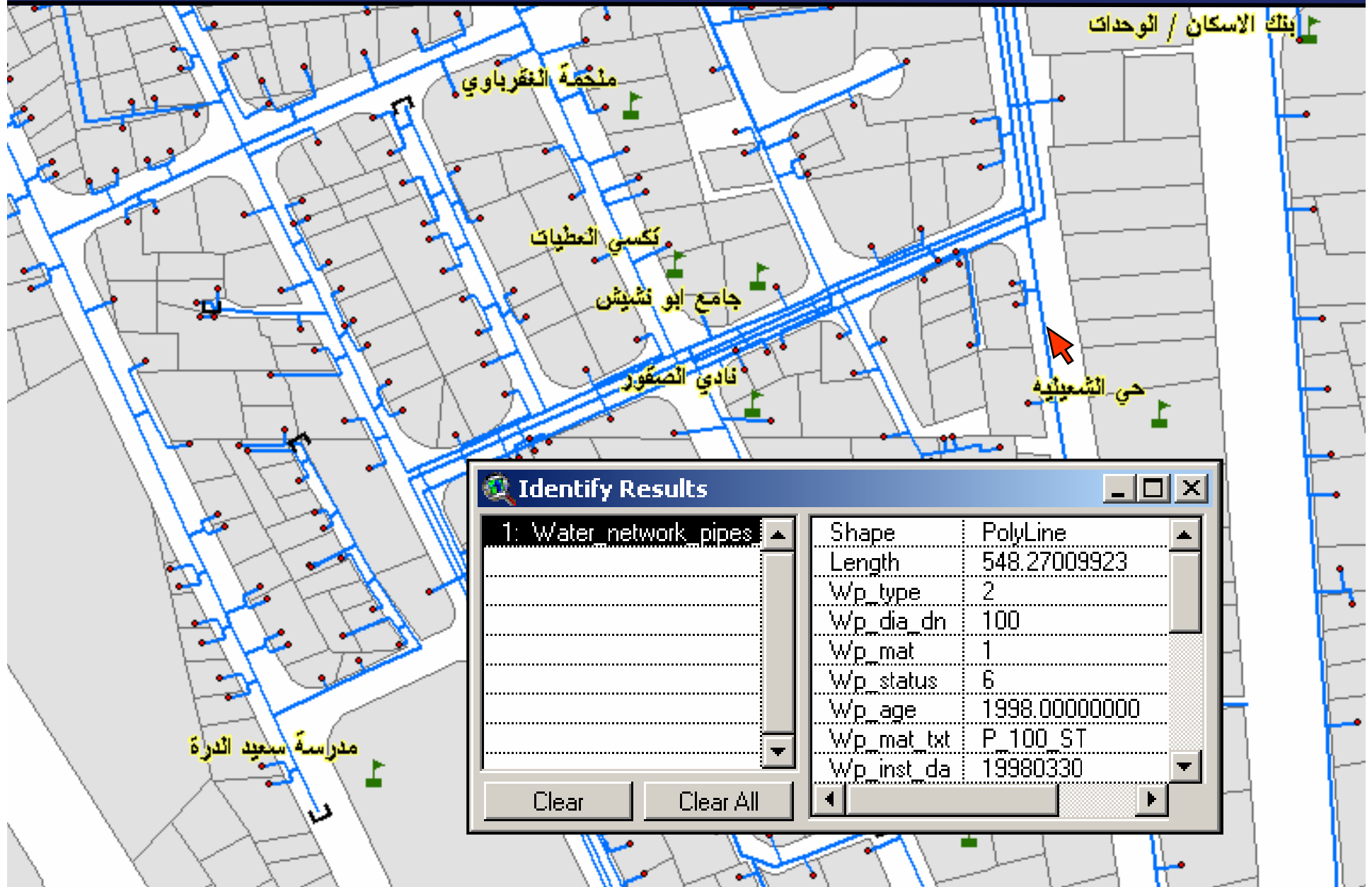
# GIS and the Water Exploitation Cycle



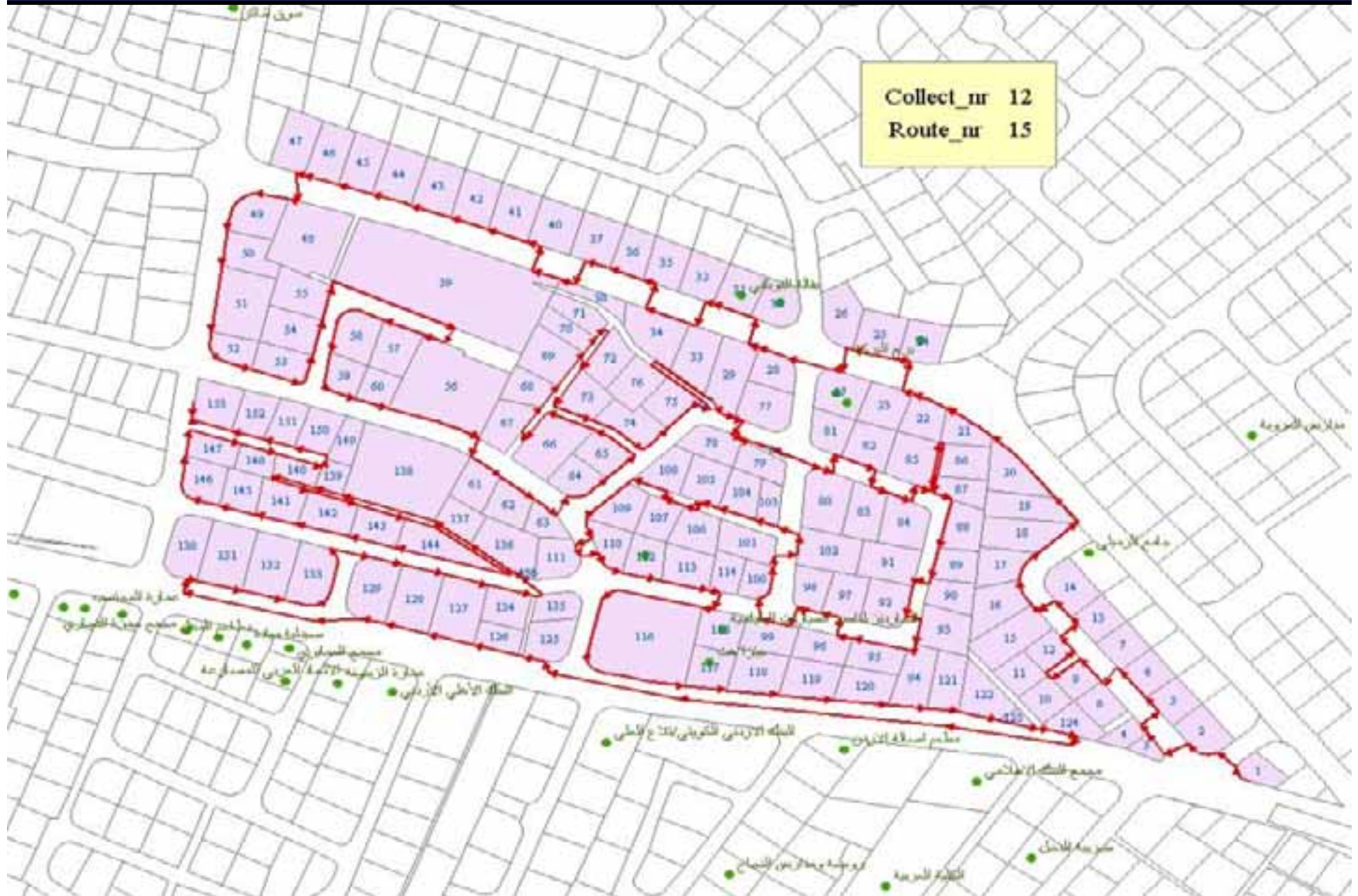
# Water Distribution Primary System in GIS



# Water Distribution Network in GIS



# Managing Collector's Routes in GIS



# Water Customers Geo-coded on Imagery



# Field Mapping of Facilities Using GPS



# GIS-Based Cartography



Amman CIP Program



C09 Project Extent



Detailed outline of Sector

## C09 Project

Northern Phase (within C07)



Programme Management Unit

Drawn By: Widad Sulaiman

Sheet No.  
211/C09/060

Checked by: Sameer Samad

Date: 01/05/08



# Case Study:

South Sudan Participatory Town Planning

# South Sudan Participatory Town Planning

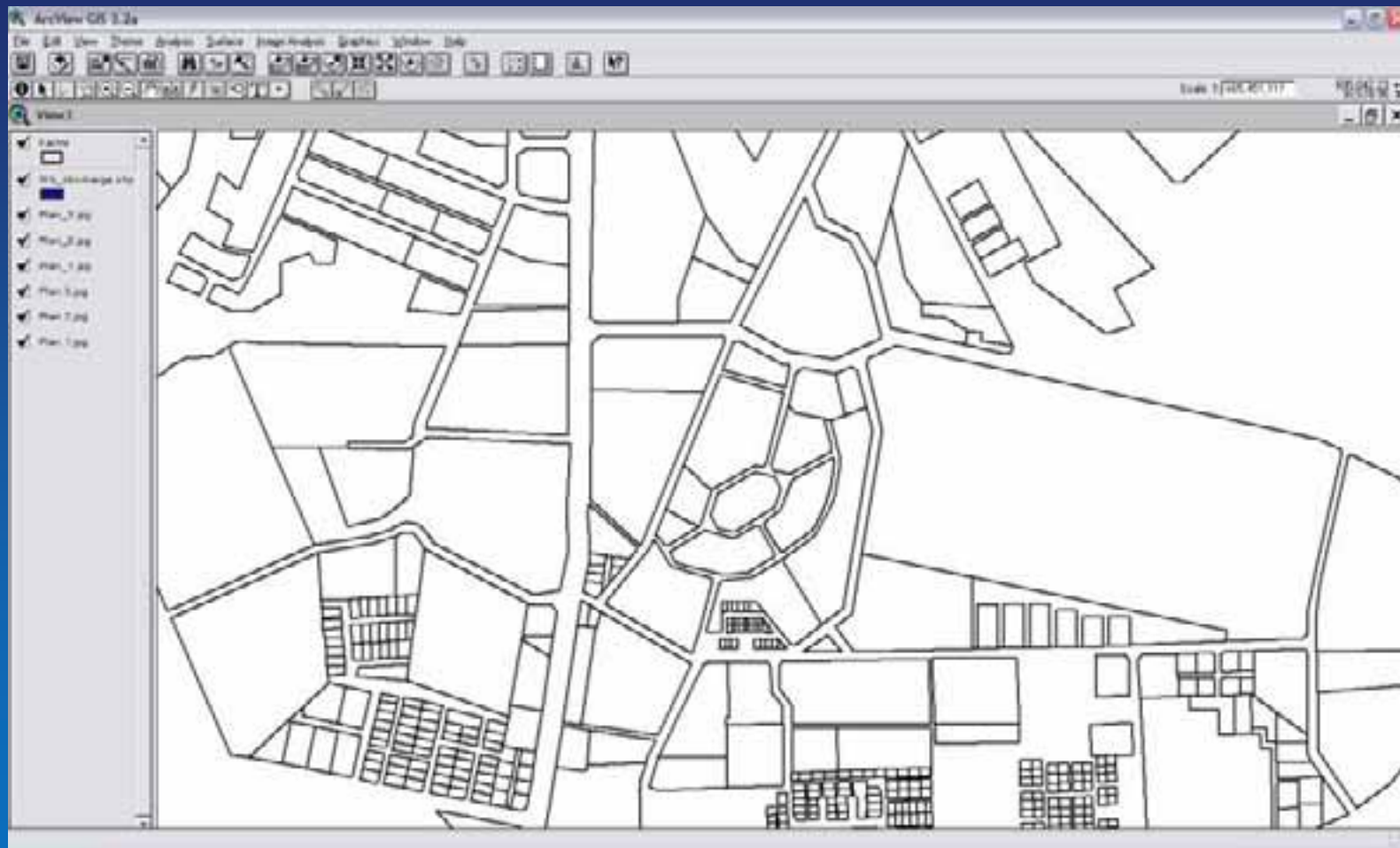


“Mapping Ten State Capitals of Southern Sudan”

More Info: [www.southsudanmaps.org](http://www.southsudanmaps.org)



# Digital Spatial Database Development



# Datasets Available at RCMRD



# Capacity Building

- Technical Training
  - Amman, Jordan – July, 2006
  - Cairo, Egypt (with NARSS) – June, 2010
- Data and Information Exchange
  - National
  - Regional
  - International
- Professional Networking
- Public Outreach
- Synergy with Existing Programs
- Functional, focused Public-Private Partnerships

# Future Activities

- Cairo, Egypt – June 14-17, 2010
- Saudi Arabia
- United Arab Emirates – November 2010
- Other regions?
- Materials Development and Templates

## Other related venues:

- World Urban Forum, Rio de Janeiro, Brazil in March, 2010
- AAG Annual Meeting, Washington, DC in April, 2010
- Global Land and Poverty Summit, September 28, 2010 in Washington, DC



# Thank You!

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