

United Nations Human Settlements Programme (UN-HABITAT)

United Nations Environment Programme (UNEP)

Environmental Management Information System (EMIS)

- **a tool for Environmental Planning and Management (EPM)**

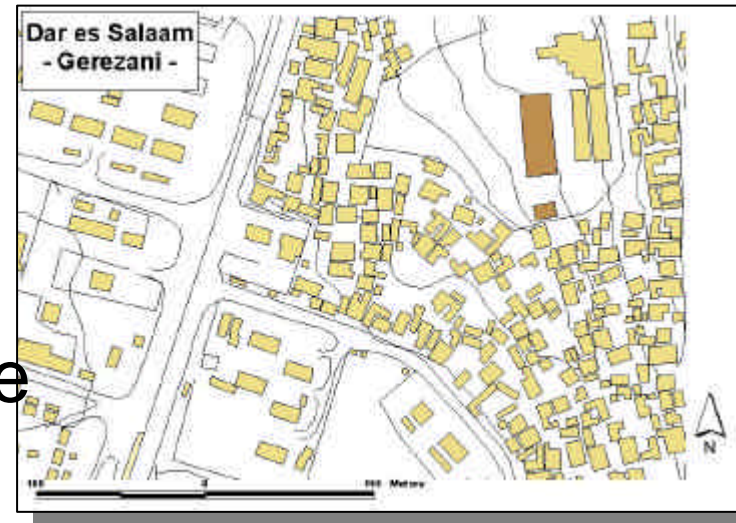
Sustainable Cities Programme (SCP)

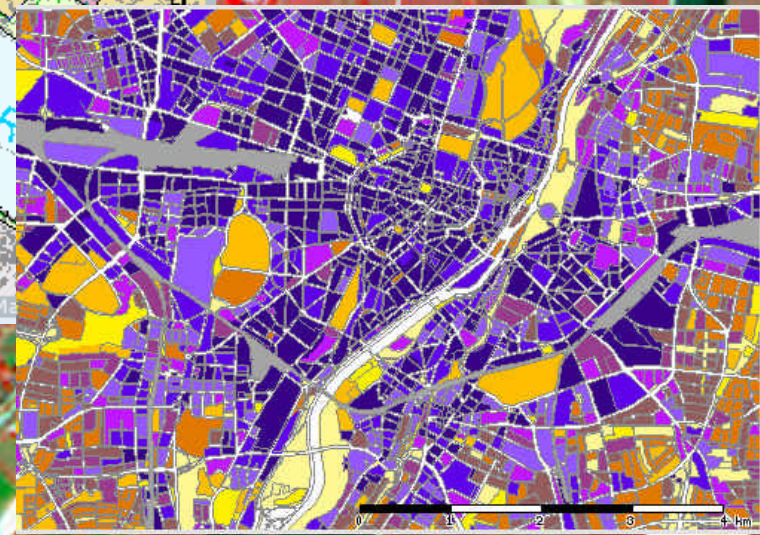
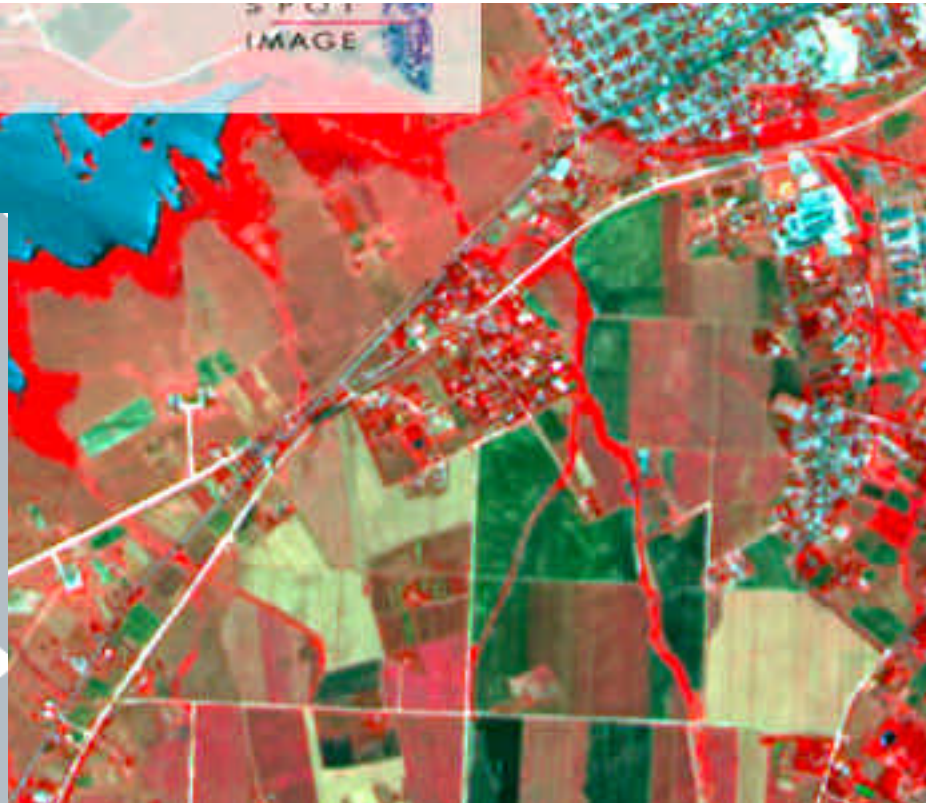
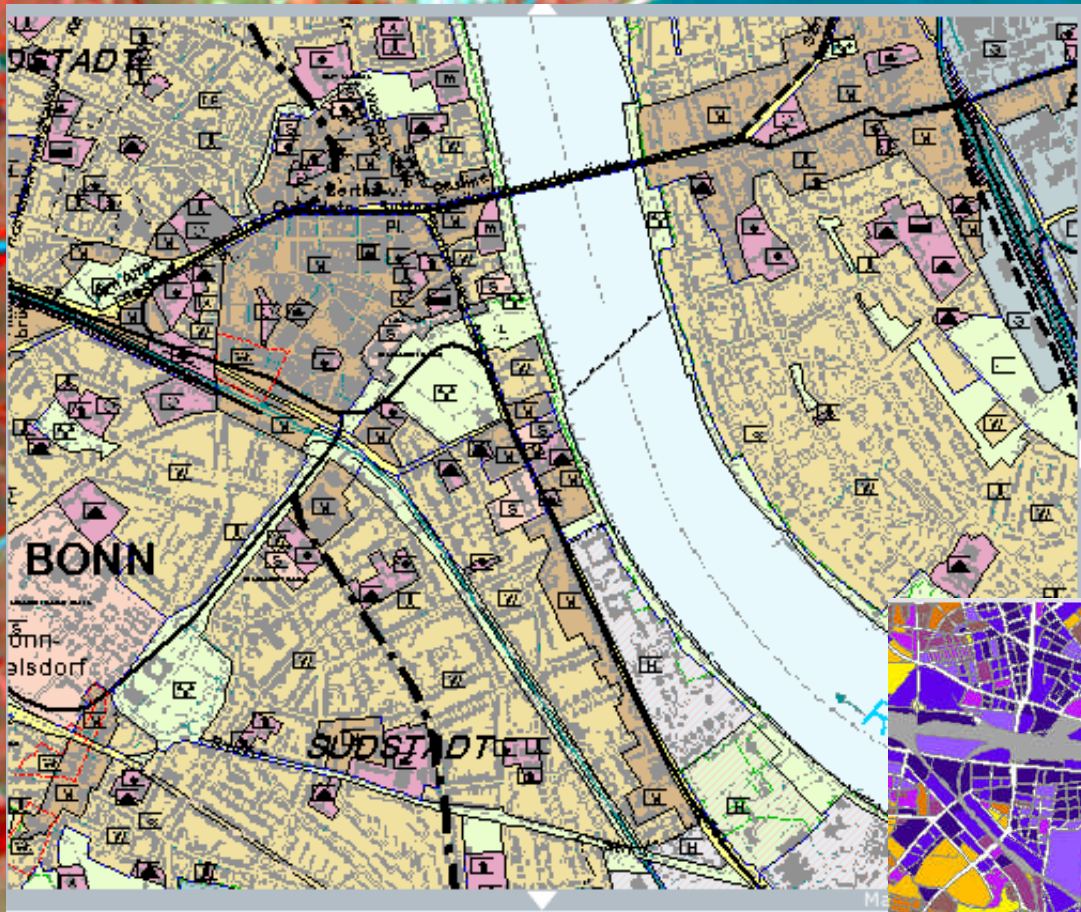
Localising Agenda 21

GIS in urban planning and management

Geographic Information Systems (GIS) are widely used in the urban context

- replacing cadastres on paper
- helping to manage infrastructure
- organizing public transportation
- for citywide development plans





Karte 500x350 px

Neu Zeichnen

Maßstab 1 : 46245

Kartenthemen

- Versiegelung 1994
- Versiegelung 1985
- Gleisanlagen

Code	Percentage
I	0 - 10 %
II	11 - 20 %
III	21 - 30 %
IV	31 - 40 %
V	41 - 50 %
VI	51 - 60 %
VII	61 - 70 %
VIII	71 - 80 %
IX	81 - 90 %
X	91 - 100 %

Hintergrundinformationen

An Environmental Management Information System (EMIS)...

...is a system for managing spatial, geographical information in the environmental planning and management

- **Environmental resource systems:** their sustainable yield and their vulnerability



- **Development activities:** their resource consumption and their potential impacts on environmental systems

Principles of EMIS

EMIS ...

- is a tool to support EPM
- is a constantly updated “learning” information system
- uses any available information sources, both scientific and non-scientific
- strictly separates facts from policies
- follows a consistent mapping rationale
- is accessible to the public, private, and popular sectors and is promoted through effective information outreach activities

EMIS in praxis

- EMIS as a tool for EPM was tested from 1997 onwards
- Handbook published in 2000
- Now used in more than 20 cities worldwide
 - In many different ways/ focus
- Main problem: how to make the system routine

Shenyang, China: Air Quality

Issue:

managing air pollution in city, identification of polluters, identification of hot-spots

Data:

6 air-quality indicators measured with mobile station

Map:

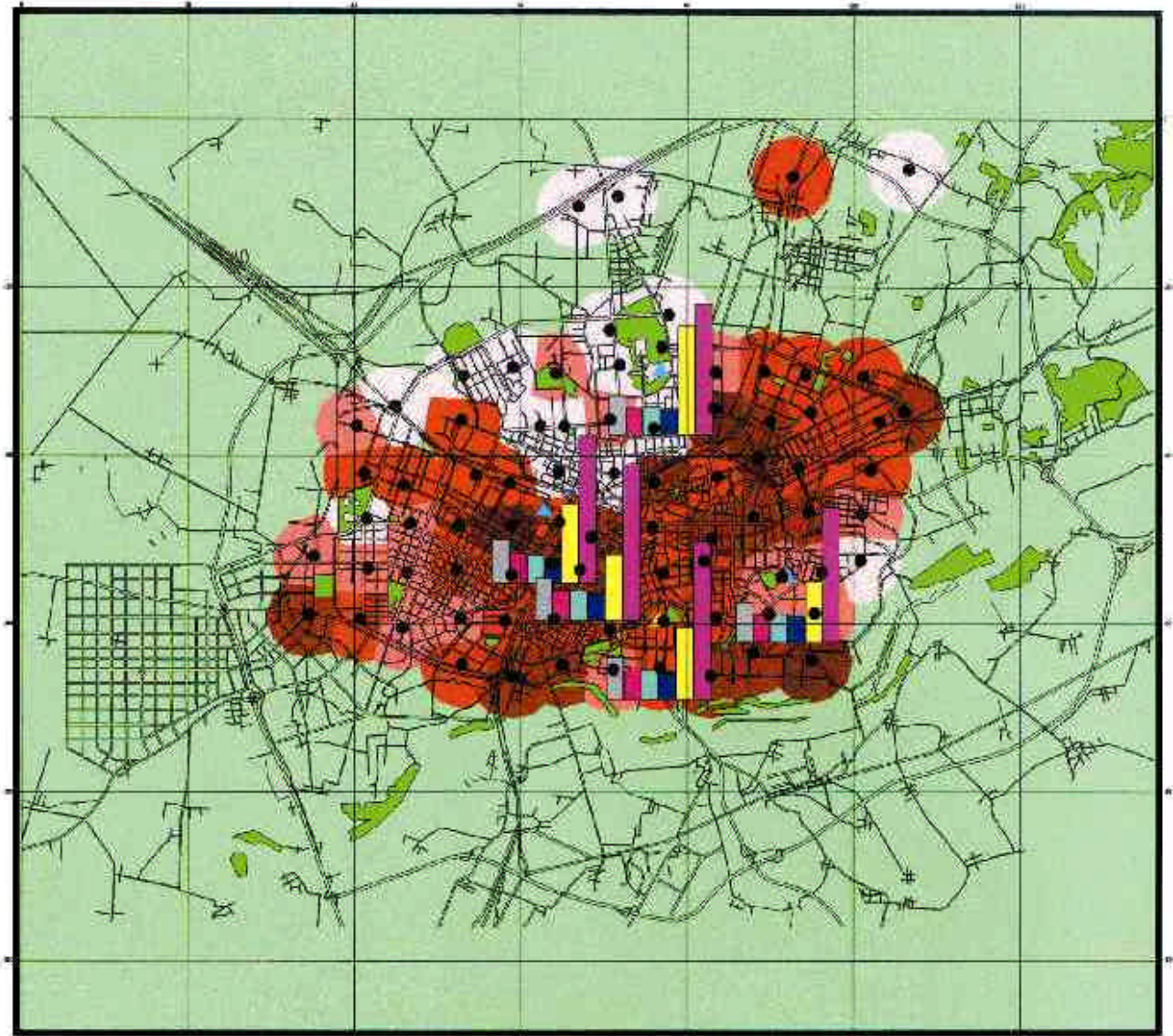
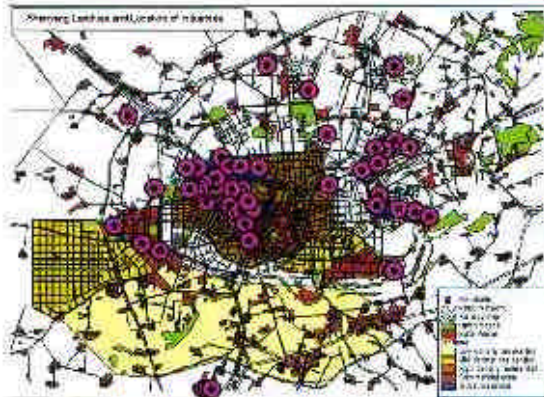
evaluation of data using policy rules, buffer tool to extrapolate point data to spatial

Shenyang Air Quality

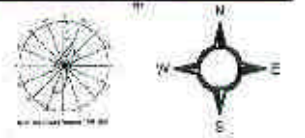
- Air Monitoring Points
- Distribution of Pollutants
 - TSP
 - SO₂
 - NO_x
 - BaP
 - Pb
 - CO
- Road Network
- Railway
- Open Space
- Air pollution (aggregated data)
 - very low
 - low
 - medium
 - high
 - very high



Source: The data was collected by the government. The data was collected by the government. The data was collected by the government.



10 km (approximately)



Nairobi, Kenya: River Pollution

Issue:

pollution of river basin through different urban activities

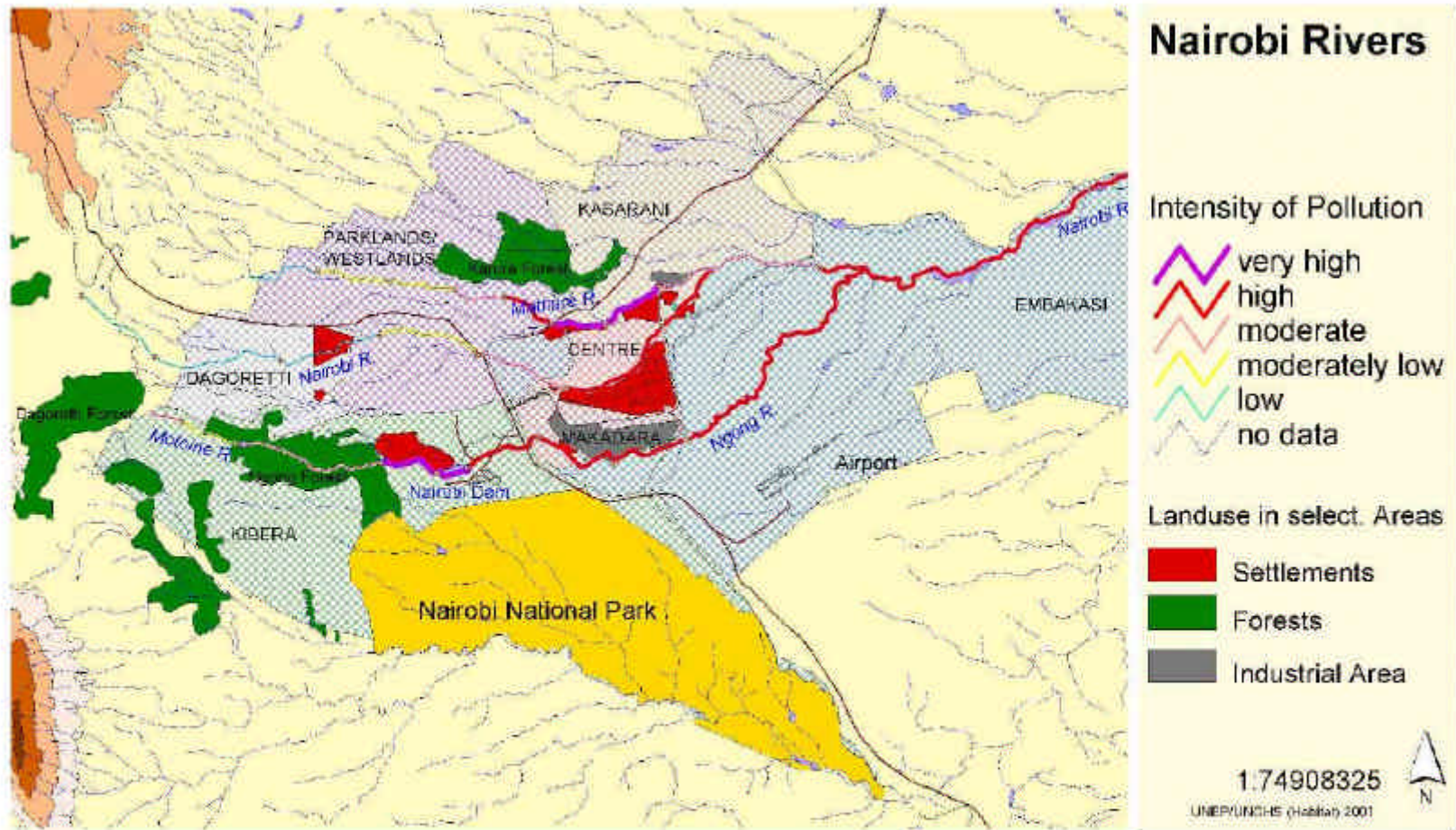
Data:

taking probes along the river measuring a number of indicators

Map:

interpretation of point data to identify degree of pollution, adding landuse to identify conflicts / hot spots

Map developed through investigation



Pollution of Nairobi Rivers

Bayamo, Cuba: Urban Mobility

Issue:

identification of un-serviced areas

Data:

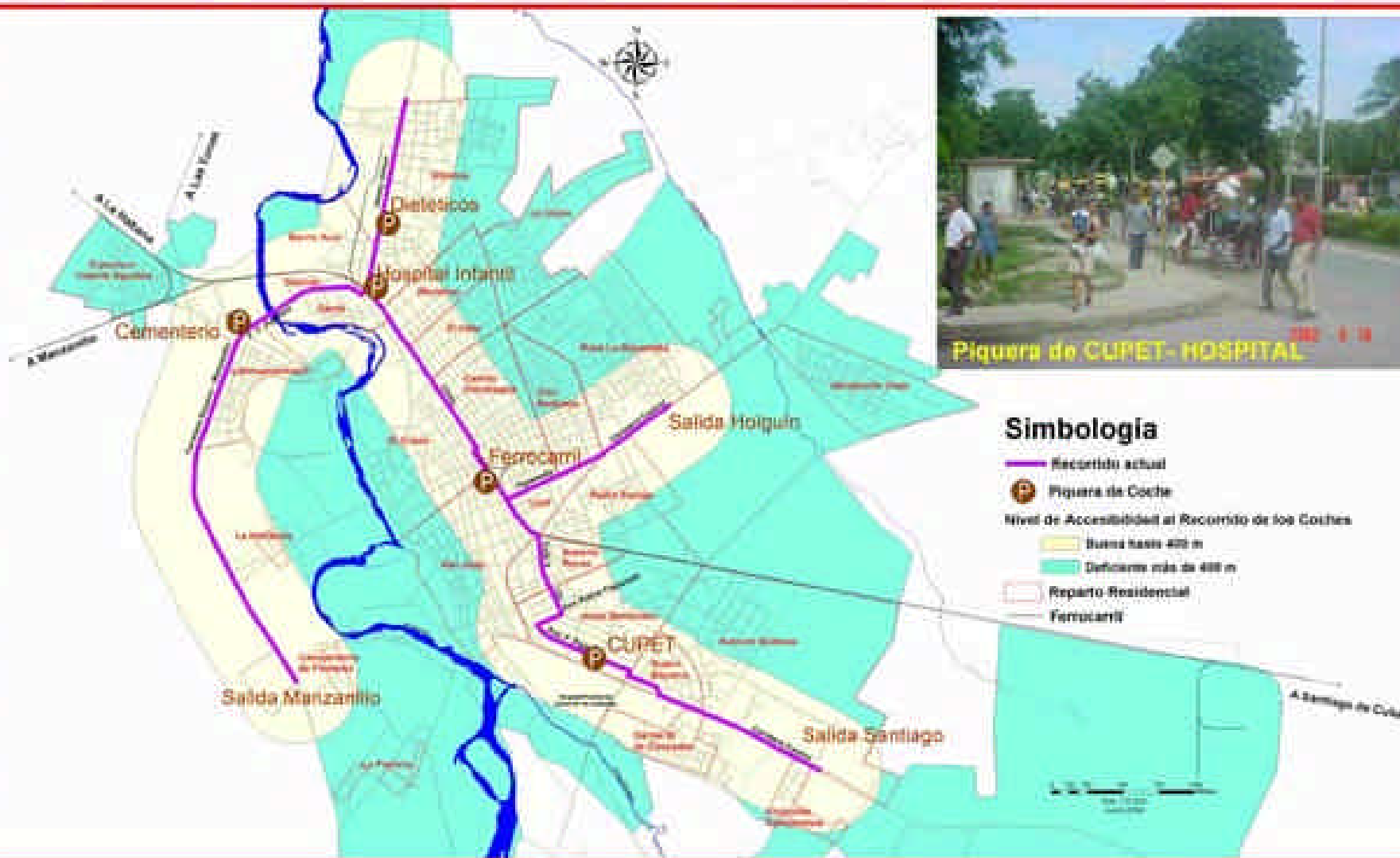
routes of horse-carts, population density

Map:

using buffer tool to identify areas within 10 minutes walking distance to the routes

RECORRIDO ACTUAL DE LOS COCHES DE TRACCIÓN ANIMAL

Proyecto Agenda 21 - Bayamo



Piquera de CUPET- HOSPITAL

Dar es Salaam, Tanzania: SUDP

Issue:

managing city expansion, urban renewal,
infrastructure => Strategic Urban Development
Planning Framework

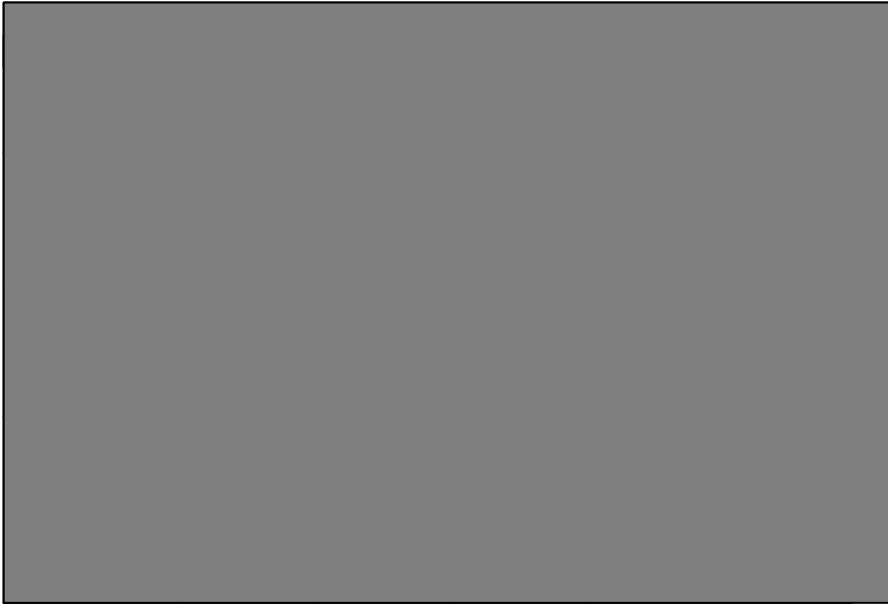
Data:

collected from 9 different working groups over 5
years

Map:

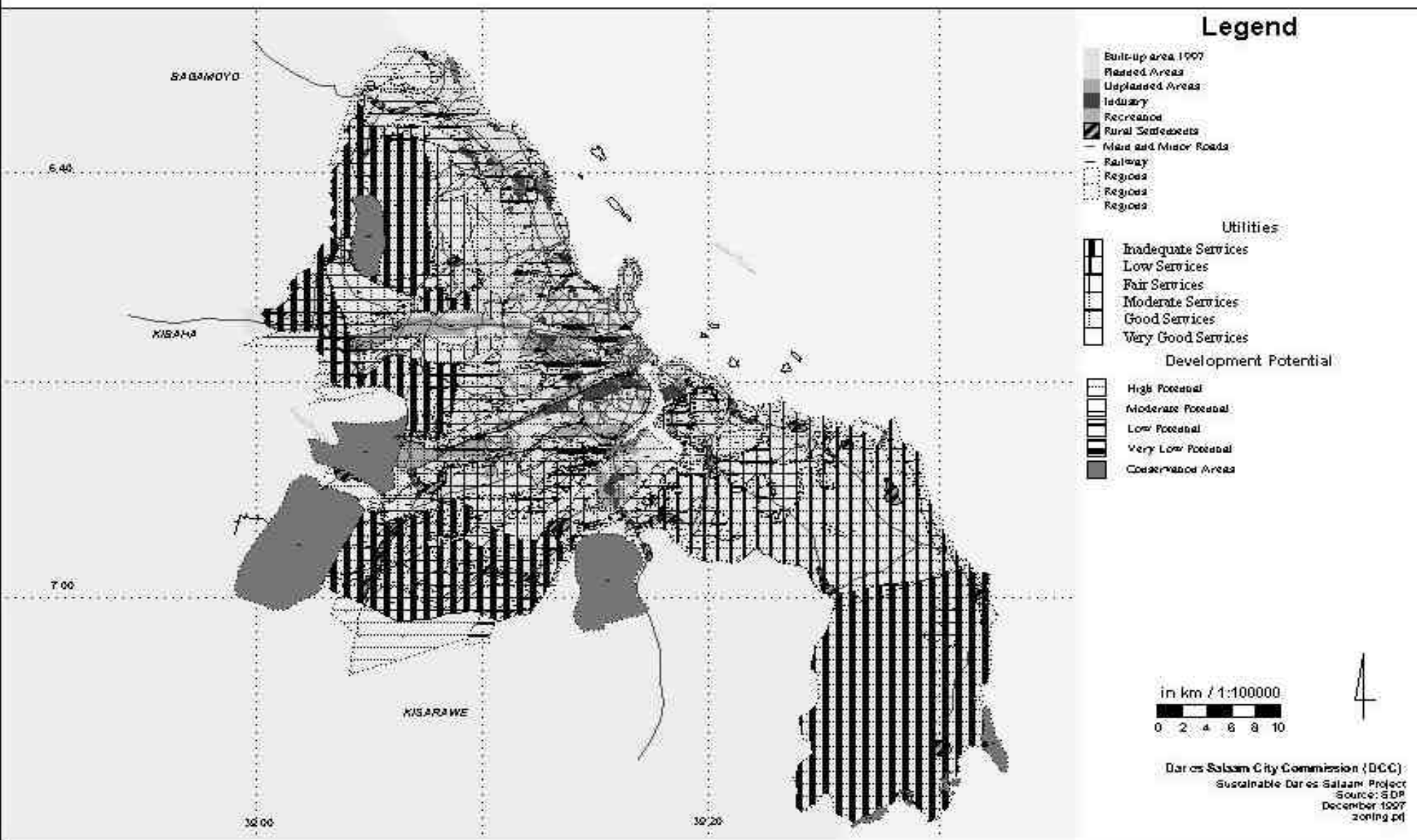
overlaying of various suitability and sensitivity maps

8. Development Pattern



- **Overlay maps with engineering constraints**
- **Overlaying maps with preservation constraints**
- **Rank constraints shown of the overall environmental constraint map**
- **Transform ranks of constraint into ranks of suitability**

Dar es Salaam - Environmental Management Framework



Legend

- Built-up area 1997
- Planned Areas
- Unplanned Areas
- Industry
- Recreation
- Rural Settlements
- Main and Minor Roads
- Railway
- Regions
- Regions
- Regions

Utilities

- Inadequate Services
- Low Services
- Fair Services
- Moderate Services
- Good Services
- Very Good Services

Development Potential

- High Potential
- Moderate Potential
- Low Potential
- Very Low Potential
- Conservation Areas

in km / 1:100000
 0 2 4 6 8 10



Dar es Salaam City Commission (DCC)
 Sustainable Dar es Salaam Project
 Source: S DP
 December 1997
 zoning.pdf

-
- High environmental risks
 - Good utility supply
 - Land available

- Low environmental risks
- No utility supply
- Land available

Sri Lanka, map server

Issue:

exchange of maps between different projects

Data:

developed in three municipalities by working groups

Map server:

accessibility of maps through the internet/ webservice



What's new
What MILES does
Who's involved
Check out maps
Munich
Vitoria-Gasteiz
Kotte
Kandy
Batticaloa
Get documents
Pick photos
Find good links

Virtual seminar

**help for
batticaloa**
sri lanka affected
by the tsunami

Check out maps



Updating printed maps and reports is very expensive and often time consuming. With more and more people having access to the internet, publishing data online is of increasing importance for municipalities. Both cities, Vitoria-Gasteiz and Munich, publish an online version of their environmental atlas (see hyperlinks, left column). In addition, the City of Munich also provides an extensive web-based health information system.

Within the scope of the MILES project, the Mapserver technology which is already used to publish maps in the case of the City of Munich is going to be adopted and transferred to the three

municipal councils Sri Jayawardenapura Kotte, Kandy and Batticaloa. Some first maps of the Kotte, which were created during the Training of Trainers Course (spring 2004) can be seen here.

Map: MCs participating in the MILES project (jpg-picture)

Search

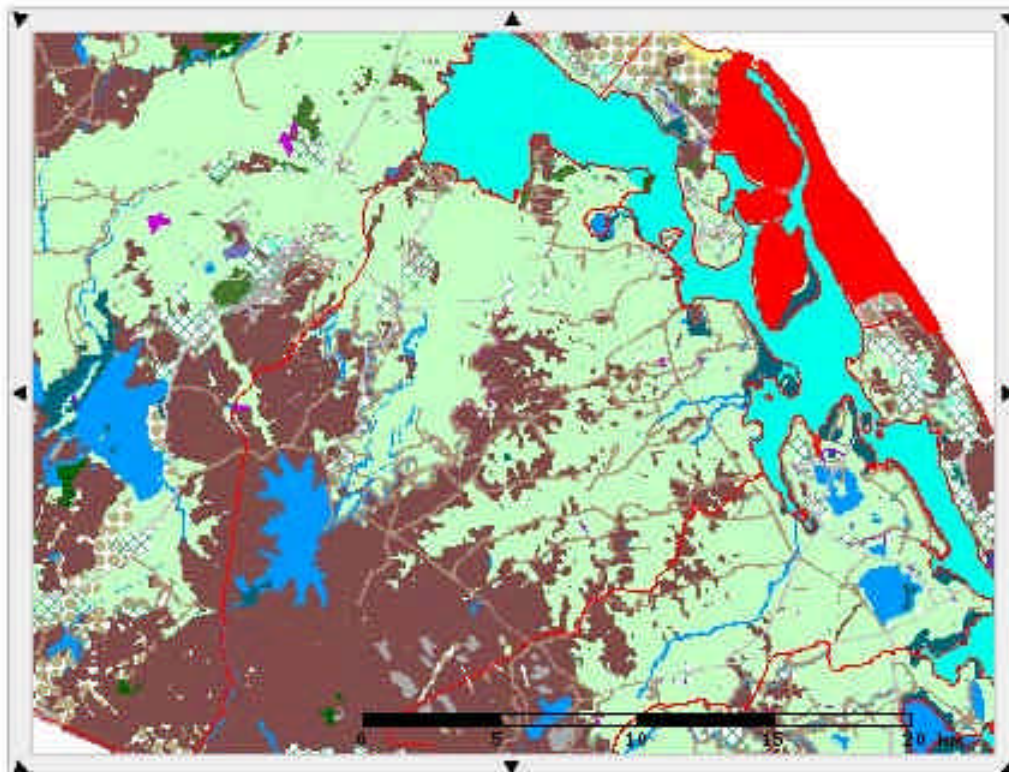


MC participating in the MILES Project (jpg-picture)



http://220.247.224.20/cgi/xt_batti.cgi?CGISESSID=dc0d37b54d8cfada0693d5a21042a18c&rm=Mapbrowse&n

Batticaloa District - Landuse



Kartenthemen

- Cities.shp
- Administrative Boundaries
- Landuse

Hintergrundinformationen



Map navigation controls including zoom in/out, pan, and scale. Scale: M 1: 250000. Includes an "Adress Search" field with a "Go!" button.

Mousedick on map: Zoom In

Lusaka, Zambia: transparent decisions

Issue:

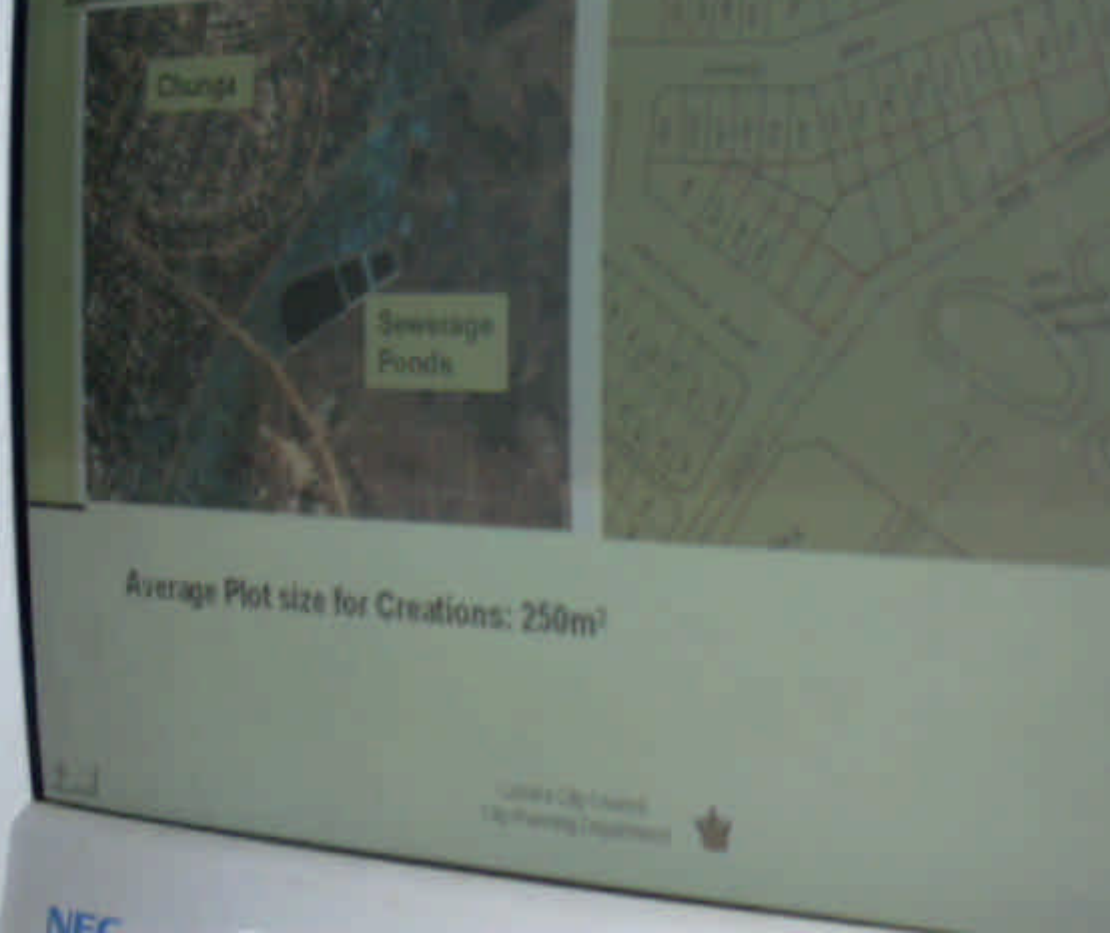
transparency for decision makers in municipal council

Data:

detailed land information system on the basis of satellite images

Map:

every proposal contains a map with details about landownership and other relevant information about plots involved

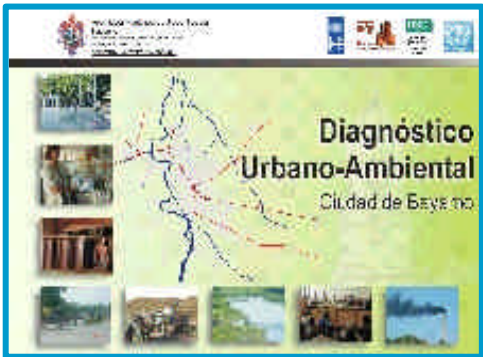


EPM Implementation Process in 5 steps

3. Working groups



Profile



4. Strategy & Action plan



2. City Consultation

Information needs in EPM process

- 1. producing, storing, and updating environmental information for Environmental Profile**
- 2. identify, clarify, and prioritise environmental issues through a geographically differentiated approach in City Consultation**
- 3. formulate strategies and**
- 4. develop action plans in working groups**
- 5. monitoring and evaluation of achievements**



Environmental Profile and EMIS

EP gives systematic over-view of the city's environment setting, activity sectors and management system,

Highlights environment-development interactions

Information needs

- Spatial orientation
- Environmental setting
- Development activities
- Management system

EMIS

- Prepare Basic Map & thematic maps on environmental and development issues
- Conduct inventory
- Store Data



City Consultation and EMIS

The City Consultation is a high-profile city-wide conference to review, assess, and elaborate urban environmental issues and agree on priority issues and to bring together key actors (“stakeholders”).

Information needs

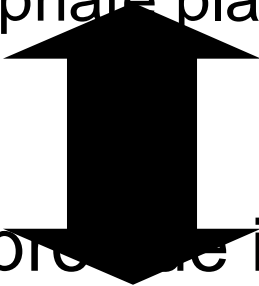
- Spatial orientation
- Awareness raising
- Environmental issues

EMIS

- Prepare exhibition with maps on environmental issues
- Distribute basic map



How Working Groups and EMIS interlink:

- Working Groups use Thematic maps to
 - elaborate strategies
 - identify the appropriate places for demonstration projects
 - Working Groups provide information and maps through
 - investigation
 - Preparation of sensitivity/ suitability maps
- 



Strategies and EMIS

Strategies are long term visions, concerning goals and general directions.

Action Plans are detailed (time, cost, actor), site specific, implementation plans.

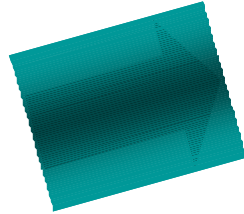
Information needs

- Development pattern
- Environmental setting
- Hot Spots
- Public awareness

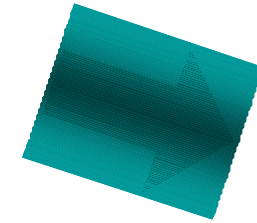
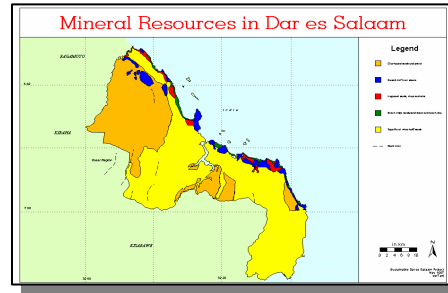
EMIS

- Analyse maps to develop strategy
- Analyse maps to identify hotspots
- Provide maps explaining the strategy
- Prepare detailed action plans

4 Basic Map



5 Thematic Maps

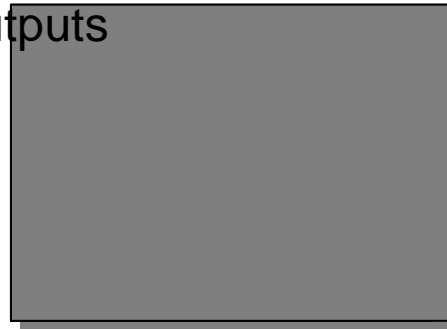


Building an EMIS Step-by-step

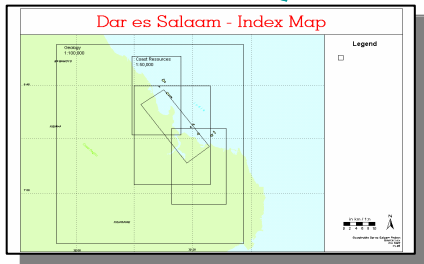
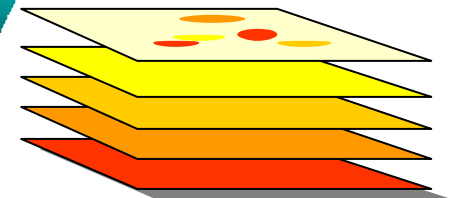
6 Suitability / Sensitivity Maps



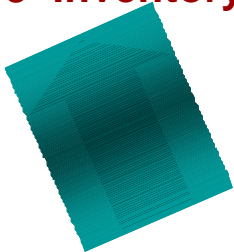
8 Outputs



7 Overlays



3 Inventory



Setting up the system

1 Equipment

2 Mapping Group



How to maintain EMIS:

- EPM is all about change
 - changing the ways in which people think about urban development and environment and
 - changing the ways in which people and institutions behave
- Institutionalisation is about making those changes permanent, building them into habits, procedures and routines.

EMIS

- needs continuous input to stay up to date
- supports the monitoring of the environment situation
- evaluates of the achievements of the EPM approach

Maintaining EMIS - problems

- qualified personnel
- funds for maintaining/ updating hard ware and software
- funds for purchasing data, satellite images
- using EMIS in day to day practice
- linking EMIS/ technical approach with participatory process

Thank you for your attention!

Urban Environment Section/SCP,
UN-HABITAT, P.O.Box 30030,
Nairobi 00100 - KENYA.
TEL: 254-20-623191, FAX: 623715
E-mail: scp@unhabitat.org
<http://www.unhabitat.org/scp>