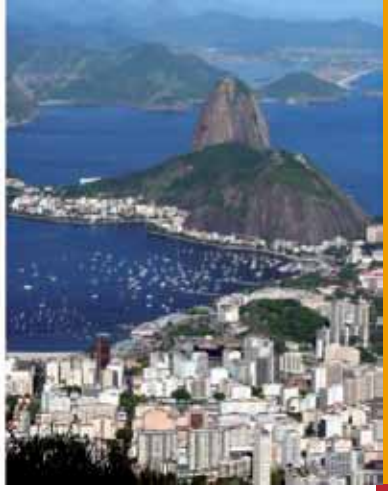
UN HABITAT
FOR A BETTER URBAN FUTURE

WORLD URBAN FORUM 5
Rio de Janeiro - Brazil
22-26 March 2010

RIGHTS TO THE CITY: BRIDGING THE URBAN DIVIDE



How to use Participatory GIS for targeting vulnerability and inequality at neighbourhood-city level

ITC
UNIVERSITY OF TWENTE.
technische universität dortmund
IRPUD

Outline of this event

- Introduction & objectives
- About vulnerability & inequality
- Role of Participatory GIS
- Discussion
- Spatial data availability
- Using free ware to map Inequality and Vulnerability
- Spatial data collection:
  - Transect walk in the City
  - Virtual transect walk in Google Earth
- Discussion

Who we are

Graciela Peters-Guarin
(IRPUD - TU Dortmund, Germany)

Jeroen Verplanke
Javier Martínez
(ITC - University of Twente, the Netherlands)

...

What do we want to achieve?

The overall aim of the training is

- *to promote a critical and reflective use of (participatory) spatial information and mapping technologies*
- *to identify, analyze and target both social and environmental vulnerability using a bottom-up and multiple scale approach*

What do we want to achieve?

- Skill 1: How to identify and discuss relevant aspects of socio-environmental vulnerability and inequality in a participatory way
- Skill 2: How to acquire and scale up information that is relevant to analyse vulnerability and inequality from neighborhood to city level
- Skill 3: How to prioritize and make decisions to bridge the identified gaps making use of geo-information

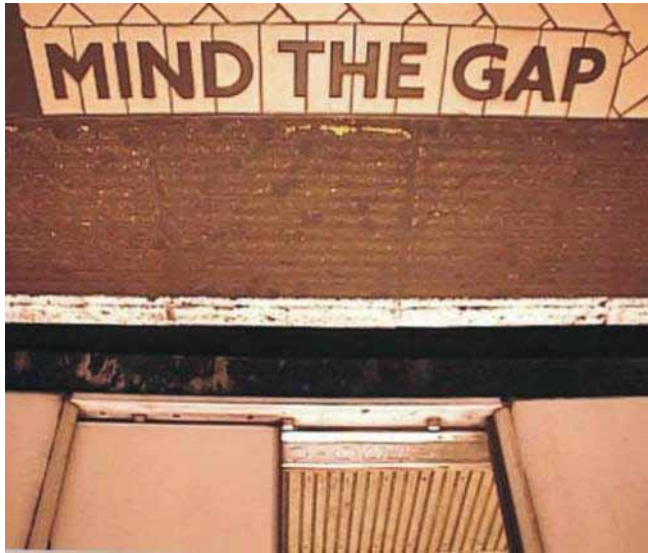
Inequalities

To achieve an “Inclusive Sustainable Urbanization”,

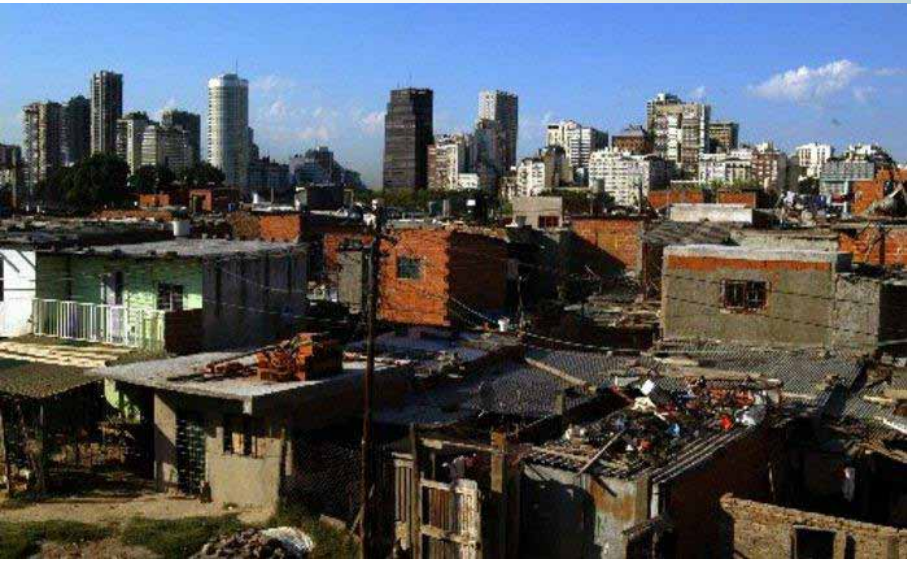
to “Bridge the Urban Divide” and,

to implement effective remedy policies,

we need to be able to recognize, identify and monitor urban inequalities



Inequality as a global problem
What are urban inequalities?



Inequality as a global problem

The spatial dimension of inequalities

- *Inequalities are particularly evident and more problematic in cities in developing countries, where there is a permanent state of growth, urban poverty and vulnerability*
  - *Unequal Quality of Life Conditions,*
  - *Inadequate habitat conditions, unemployment,*
  - *Unequal access to physical and social infrastructure…*
- *What all these problems have in common is a spatial dimension, since they all occur and tend to be concentrated in specific areas of the city*

Cities at Risk

- Urban areas provide a number of socio-economic opportunities for jobs and income generation
- but are also simultaneously becoming increasingly risky places to live, especially for low-income residents of cities in developing countries.
- Exposure to environmental risk and hazard is a result of physical processes (i.e. poor building construction, lack of urban planning, lack of infrastructure), and human processes (i.e. lifestyle choices and consumption) that renders the more informal parts of cities particularly vulnerable

What does Urban Vulnerability mean?

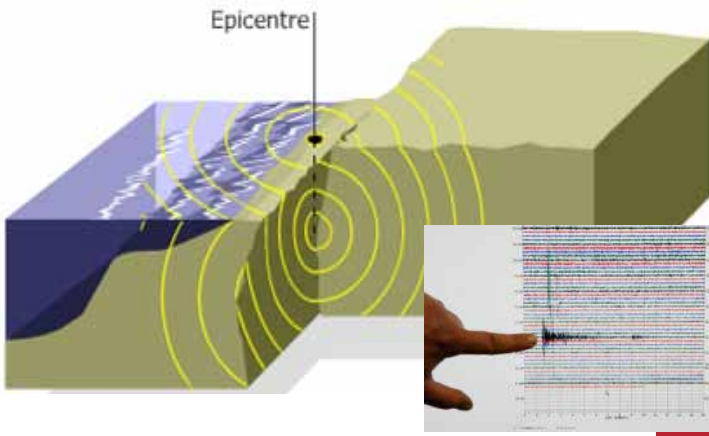
- The characteristics and circumstances of a community, system or asset that make it susceptible to the damaging effects of a hazard (ISDR).

- Urban vulnerability to natural (i.e earthquakes, floods, hurricanes) or man-made (global warming, chemical spills, contamination) events is a function of human behavior.

- It describes the degree to which socioeconomic systems and physical assets in urban areas are either susceptible or resilient to the impact of environmental hazards.

Natural

event

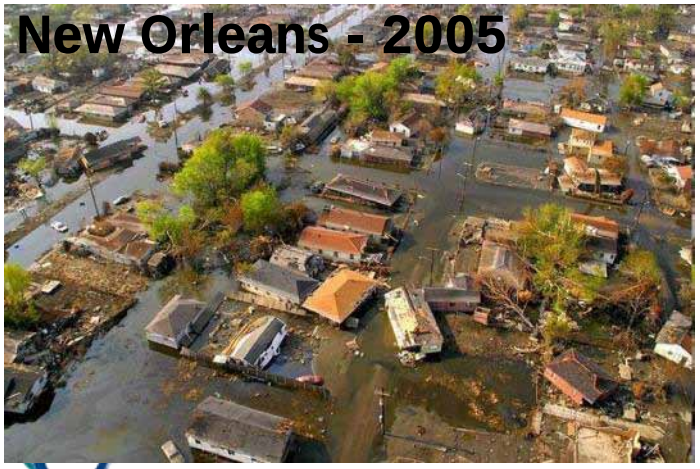


Environmental Hazard

+

Vulnerable

context



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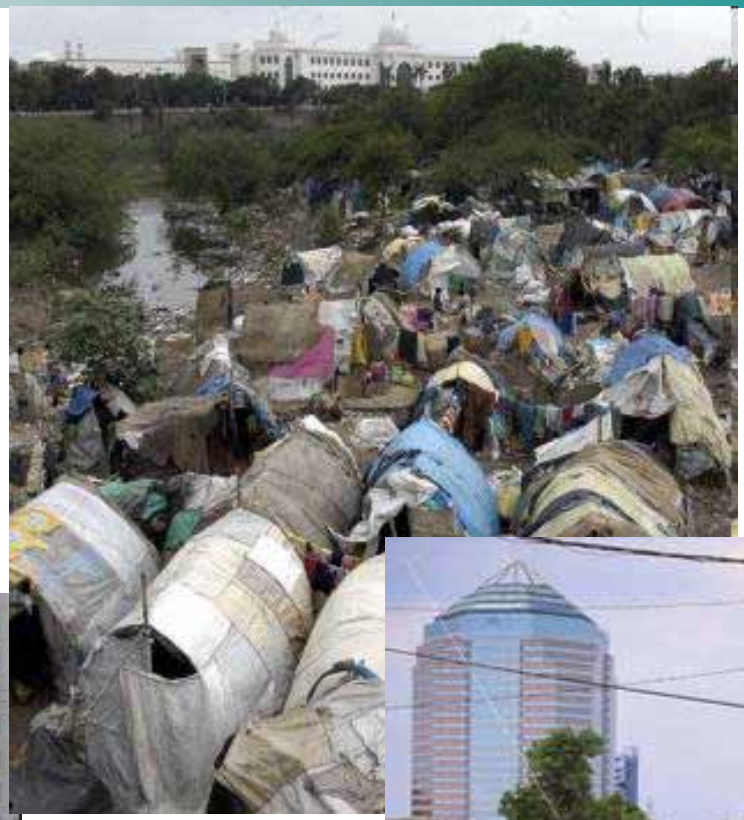
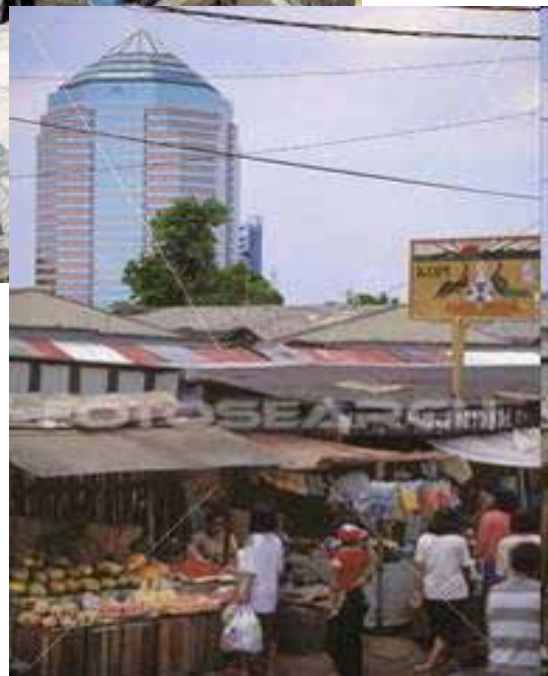
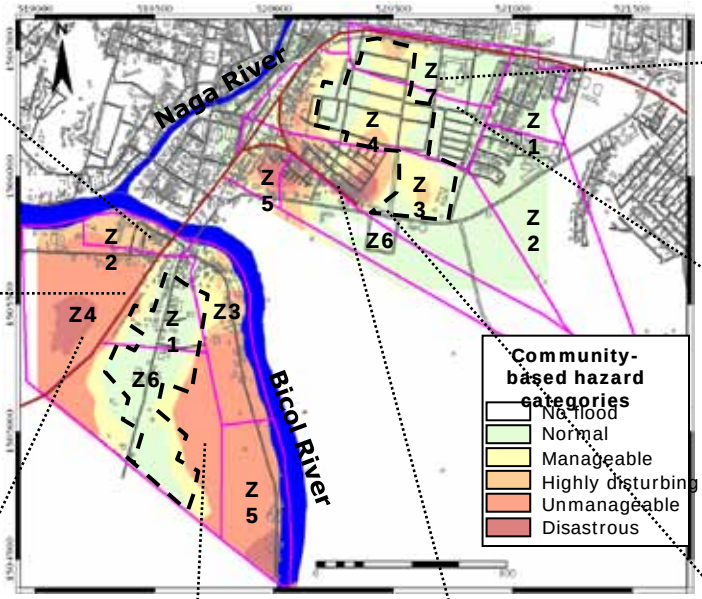
economic loss and social disruption = **Disaster**

forms and severity of Vulnerability vary remarkably among different areas and groups of people





… and even within any local community…
Spatial distribution of differential flood vulnerability:



Inequity and 'vulnerability' are spatial problems

- can be assessed through a combination of ecological factors associated with the physical conditions of the geographic space where the urban community is located (i.e. where you are), and the social conditions of the population in that place (i.e. who you are).

- In many cities the segregation patterns of ethnicity and socio-economic classes, accompanied by successive waves of economic restructuring and population expansion, are reflected by the built environment, urban infrastructure, road and facilities networks.

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PGIS can help to target Inequity and 'vulnerability' at urban level

- It helps to identify and target factors such as environmental stress, poverty, inequality, health status and various aspects of governance (Adger et al., 2004).

- Allows the involvement of different perspectives regarding prevention, vulnerability and risk reduction.

- multi-criteria modeling using indicators may help to identify the status of the system before the hazardous event occurs characterized by unequal access to safe conditions or the "vulnerability" that may lead the system to crisis.

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Participatory GIS (PGIS)

- PGIS (PPGIS) is NOT a software or a "kind of GIS"
- A 'practice' combining Participatory tools and spatial information.
- Tools mainly known from PRA, RRA, PLA
- Spatial information coming from external and in particular local sources

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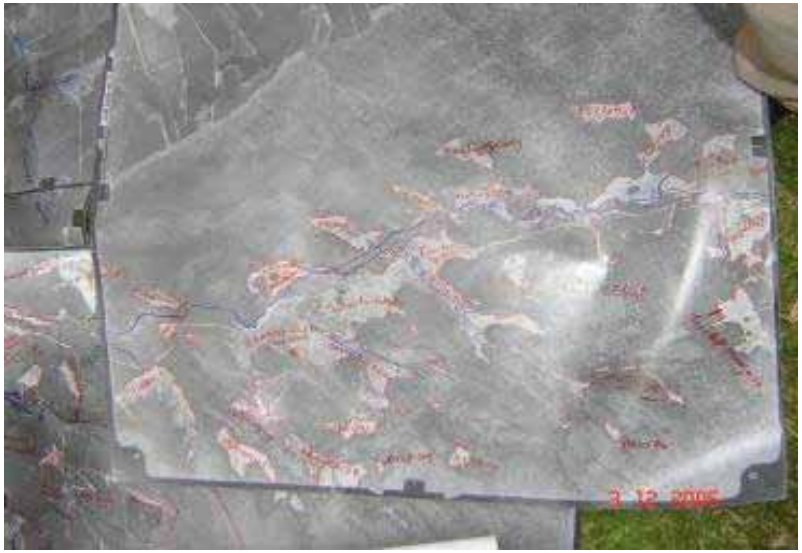
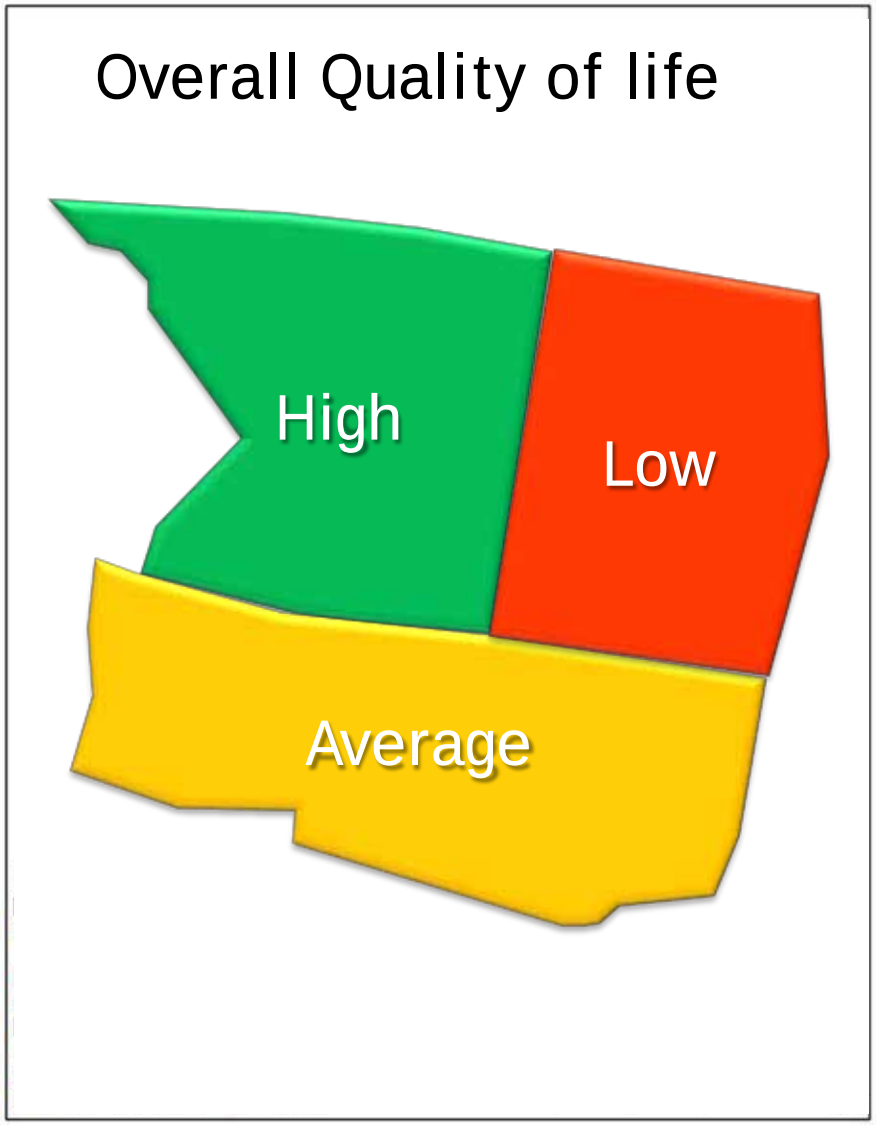
PGIS & P-Mapping Applications:

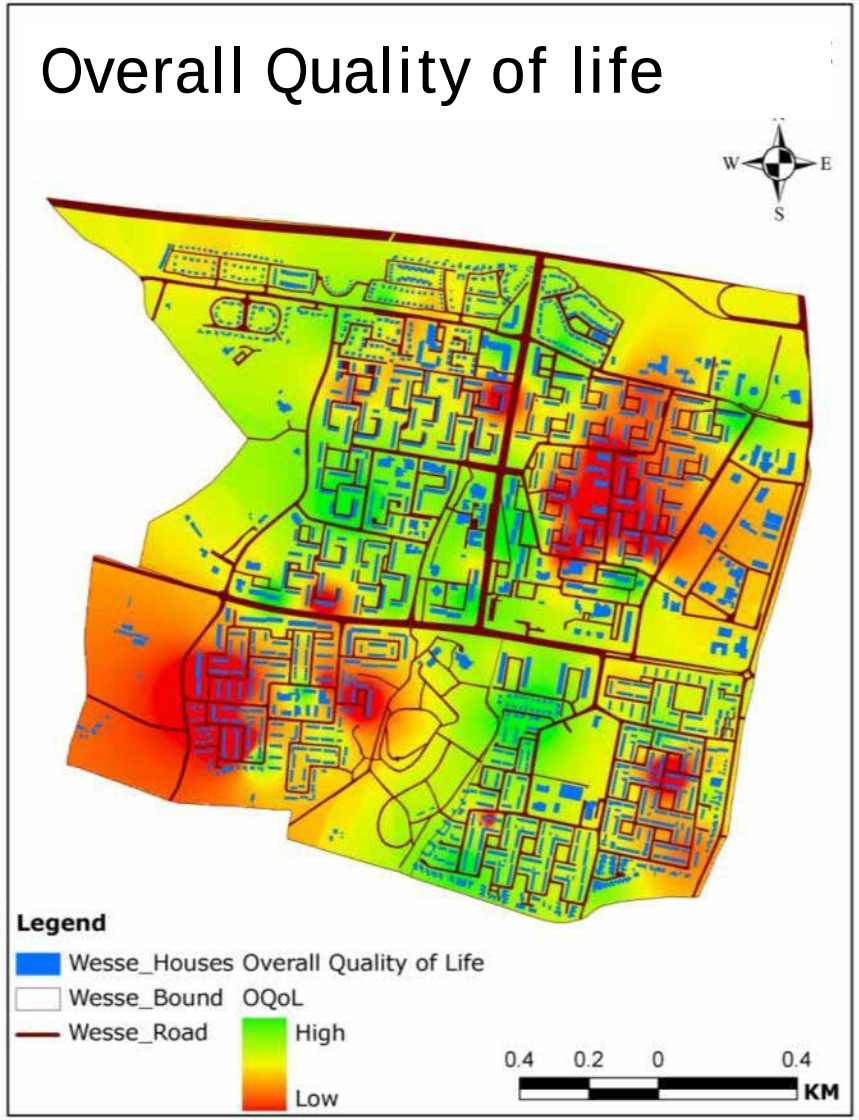
- Land & Resource Claims
- Local Spatial Planning
- Community/neighbourhood action
- Community Risk Assessment

Mapping Land Claims using Aerial Photographs & LK



Priorities for local spatial planning



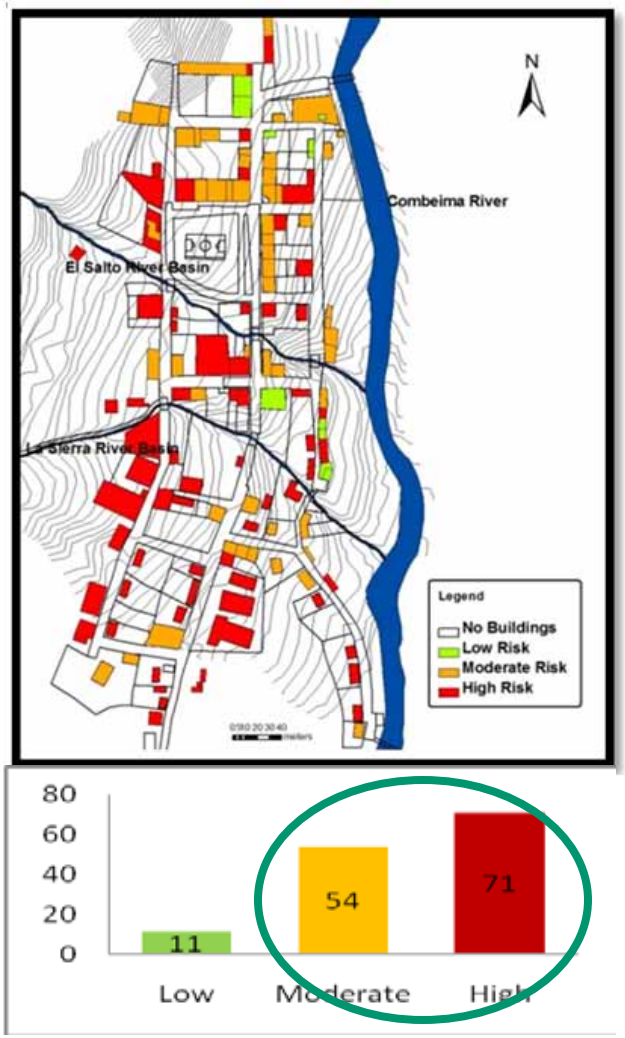


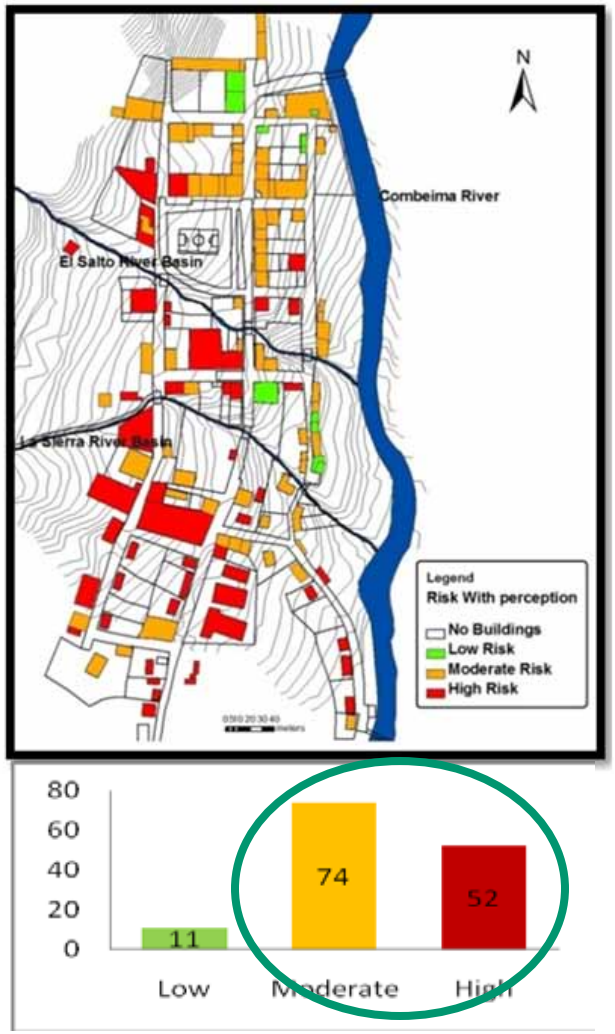
Community Action

Mapping Urban Security with Aerial Photos


Involving Children

Community Risk Assessment





<u>Without</u> Perception of Debris Flow Risk

<u>Including</u> Perception of Debris Flow Risk

Source: E. Garcia, 2009

Using the Web (1.0)

- Information access to the public
- Assists transparency
- Enables communities to formulate their own plans

- Not very participatory although it offers the opportunity to add local and qualitative information.

Edit View Go Communicator Help

Back Forward Reload Home Search Netscape Print Security Stop

Bookmarks Location: http://ure.leeds.ac.uk/slaithwaite/secret.html What's Rela

Slaithwaite Virtual Decision-Making

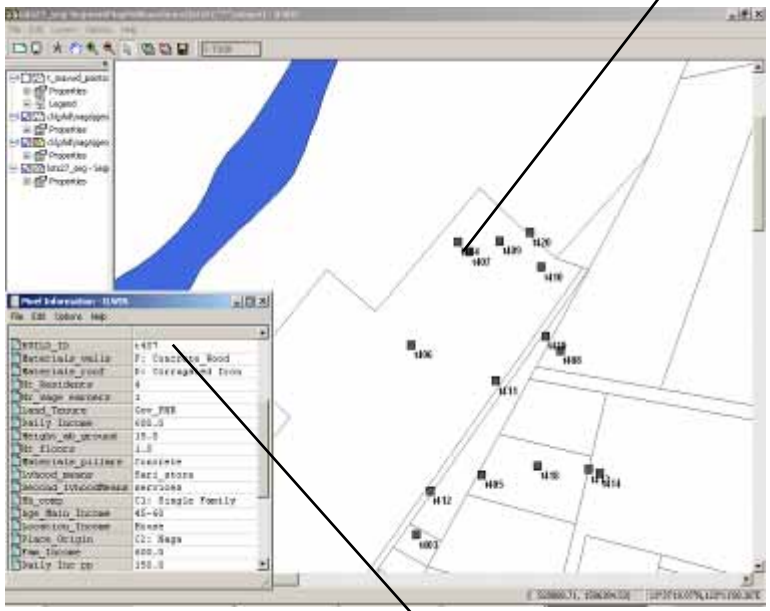
e following comments were made:

think that the traffic problem in carrs road lorries and other hgvs could be re-routed ay from the village center by an alternative d which crosses the river further down ards huddersfield directly on to manchester d. When the canal project is being structed we envisage terrible congestion due the heavy traffic which has to travel along rs road to the industrial estate. Our second nt is the appearance of the shop fronts in rs road. Their aesthetic appearance is not ducive to how we perceive the village once canal project has been completed. The whole the shop fronts that line carrs road and line route of the canal really ought to be urbished in some consistent style which fits in canal ambiance. Once this has been done haps the canal and the shops could be brought ether with cobbles.

urn to previous screen

Finish Reset
View Comments Map

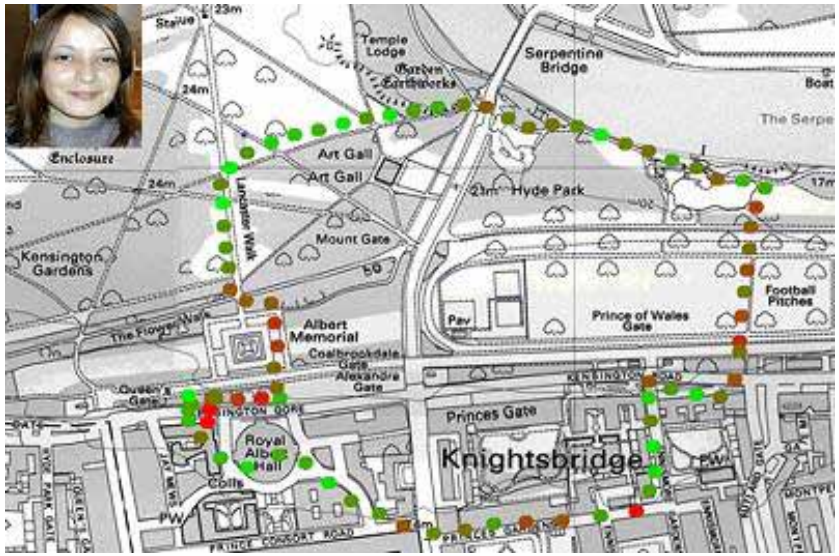
More than maps..

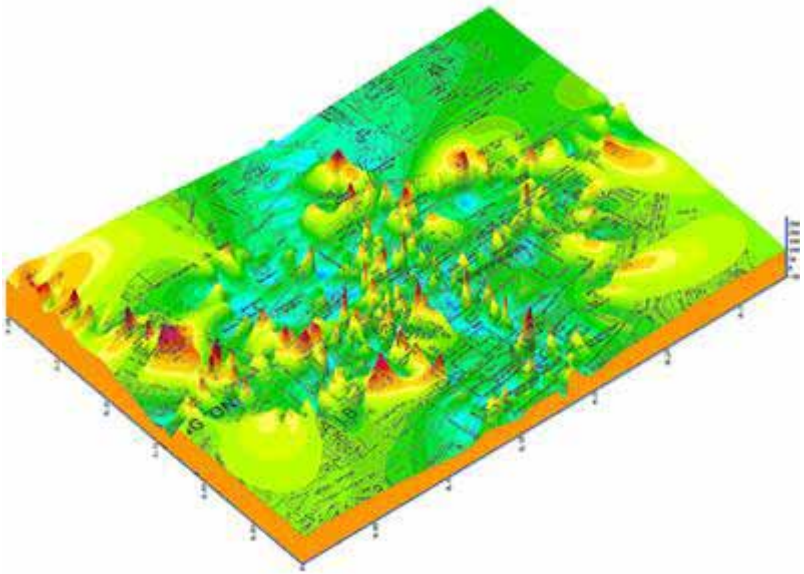


Mr B's is a four member family composed by father (62) mother (54) and two daughters (19 and 20) in high school. Main family income is derived from a sari-sari (small grocery) store located in the same dwelling which in turn is one-storey, made of wood and with no pillars to avoid flooding. In this zone the land is property of the Philippine National Railroad (PNR) and even though they have been settled in this place for 24 years they do not have land tenure entitlements. Because of the possibility of eviction they cannot invest in safer materials for building (such as concrete) therefore their house's structural vulnerability to floods remains high. They use to experience moderate flooding at least once a year because this use to be a natural swamp for water-retention during flooding. During typhoon Rossing (1995) this place experienced 5 to 6 feet flooding, the house was destroyed and besides they have to consume the few products they were able to save from the store. They lost their investment in the store which came from Mr B pension fee. Even if they got some relief from the Local government (some wood and nippa leaves for roofing) to be able to rebuild the house they had to go for a loan with their relatives and start diversifying their livelihood by selling fish in the market. They considered the effects of the typhoon as disastrous because their house and their means of livelihood were disrupted, they didn't have too much to eat during several days and afterwards they had a debt. It took them nearly one year to recover from the effects derived from the flooding. They decided to settle here because they cannot afford to pay for safer land in other area and besides is close to Mr L work place and their children high school as they also cannot afford to pay for transportation.

Greenmap.org

BioMapping.net





Gawker's New York City Subway Smell Map

GAWKER
New York City Subway Smell Map

Introducing Gawker's **New York City Subway Smell Map**. Created from reports sent in by Gawker readers, the map displays particular smells -- horrific and sublime -- encountered throughout New York's subway stations. Mouse over any station to see the station name, subway lines, and types of smells to be found there. Click on any station for a popup with actual reader smell reports.

Smell something? Say something to subwaystink@gmail.com. Give us the station, subway line, and the smell you detected, and we'll incorporate your report into the map.

For more Gawker goodness, be sure to check out the Gawker Stalker Map.

Smells of the City

- Alcohol
- Body Odor
- Chemicals
- Feces
- Food
- Mold & Wet
- Perfumes
- Sewage
- Urine
- Vomit

Subway map imagery provided by onnyturf.com. Visit the full-featured Subway Map at onnyturf.com/subway.

http://gawker.com/maps/smell/

Web 2.0 as a planning tool?

- Web 2.0 is known for it's communication add-ons to the www.
- Opportunity to interact live, including voice and image.
- web-based communities such as social-networking sites, video sharing sites, wikis and blogs.

Web 2.0

- Two way information access for the public
- Feedback for decision makers
- Assists transparency
- Enables communities to **promote** their own plans

See Google Earth Communities

Opportunity knocks for PGIS

- Community mapping provides inclusive graphic framework for people to affirm and pool their experiences & knowledge about home place.

- Community Mapping relies on active engagement of participants.

see Google Earth Communities

Opening Discussion

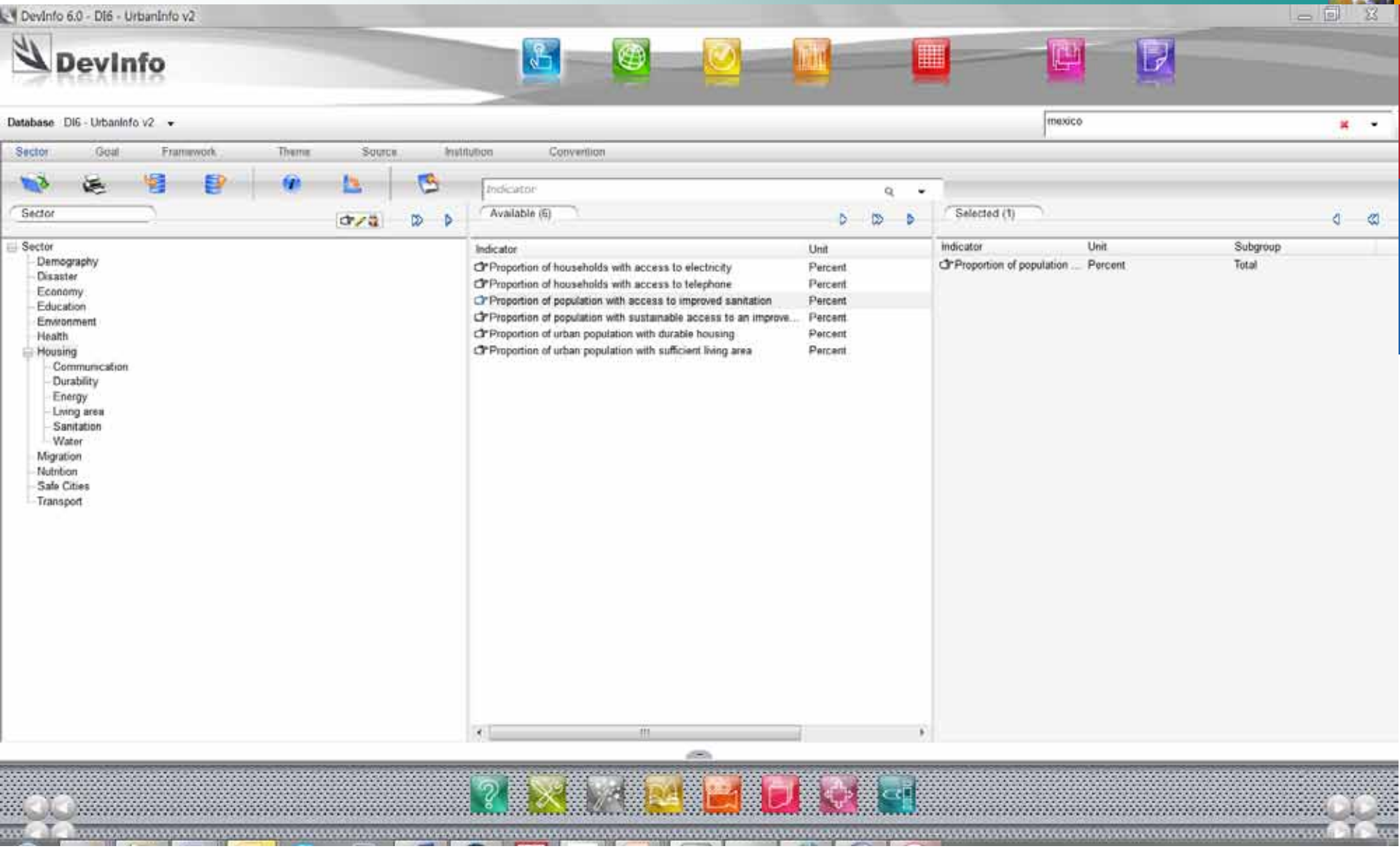
- what are the typical issues you are faced with when it comes to targeting vulnerability and inequality at city level?
- Which are the typical areas where the most disadvantaged and vulnerable are located in the city?
- Which tools do you use to identify these areas?

(Spatial) data availability

- "Top-Down"
- Mostly highly aggregated
- Census data
- Administrative data with geo reference
- Sometimes available online

- A few examples:

UrbanInfo / DevInfo



UrbanInfo / DevInfo

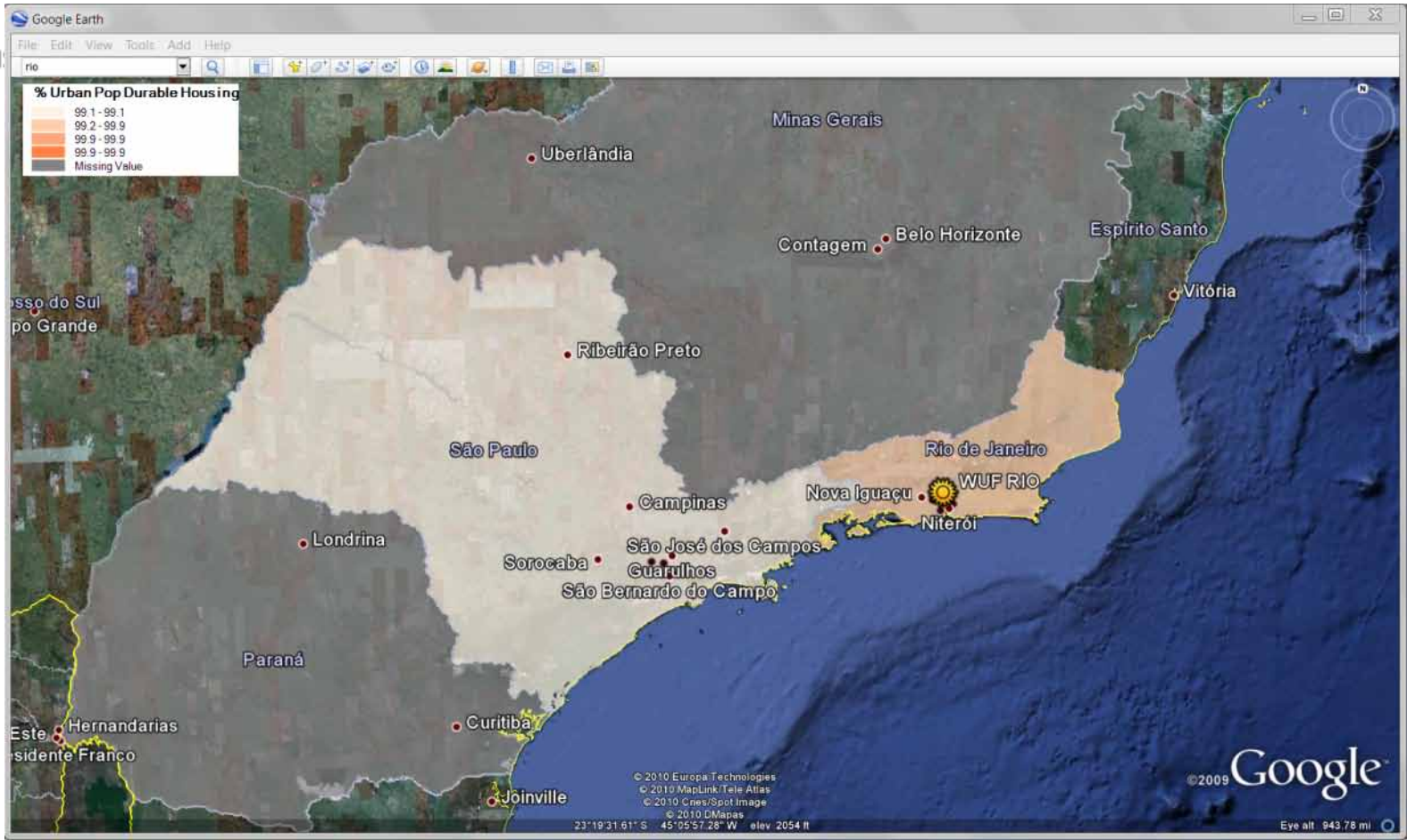
UrbanInfo / DevInfo > Google Earth

UrbanInfo / DevInfo > Google Earth

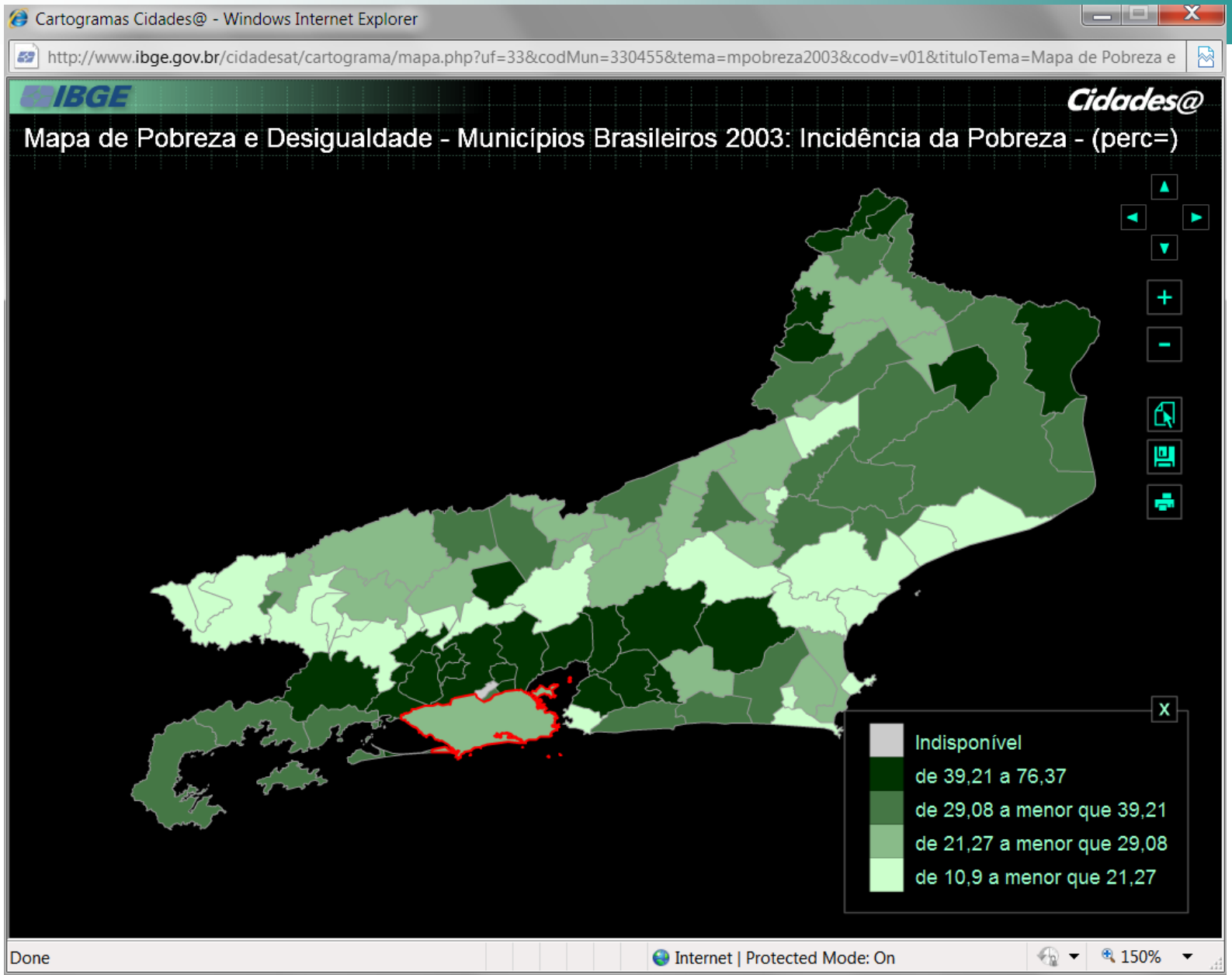
Area Name	Proportion of households with access to electricity Total	Proportion of population with access to improved sanitation Total	Proportion of population with sustainable access to an improved water source Total	Proportion of urban population with durable housing Total	Proportion of urban population with sufficient living area City
Rio De Janeiro	99.60	83.50	89.40	99.90	89.70

Source

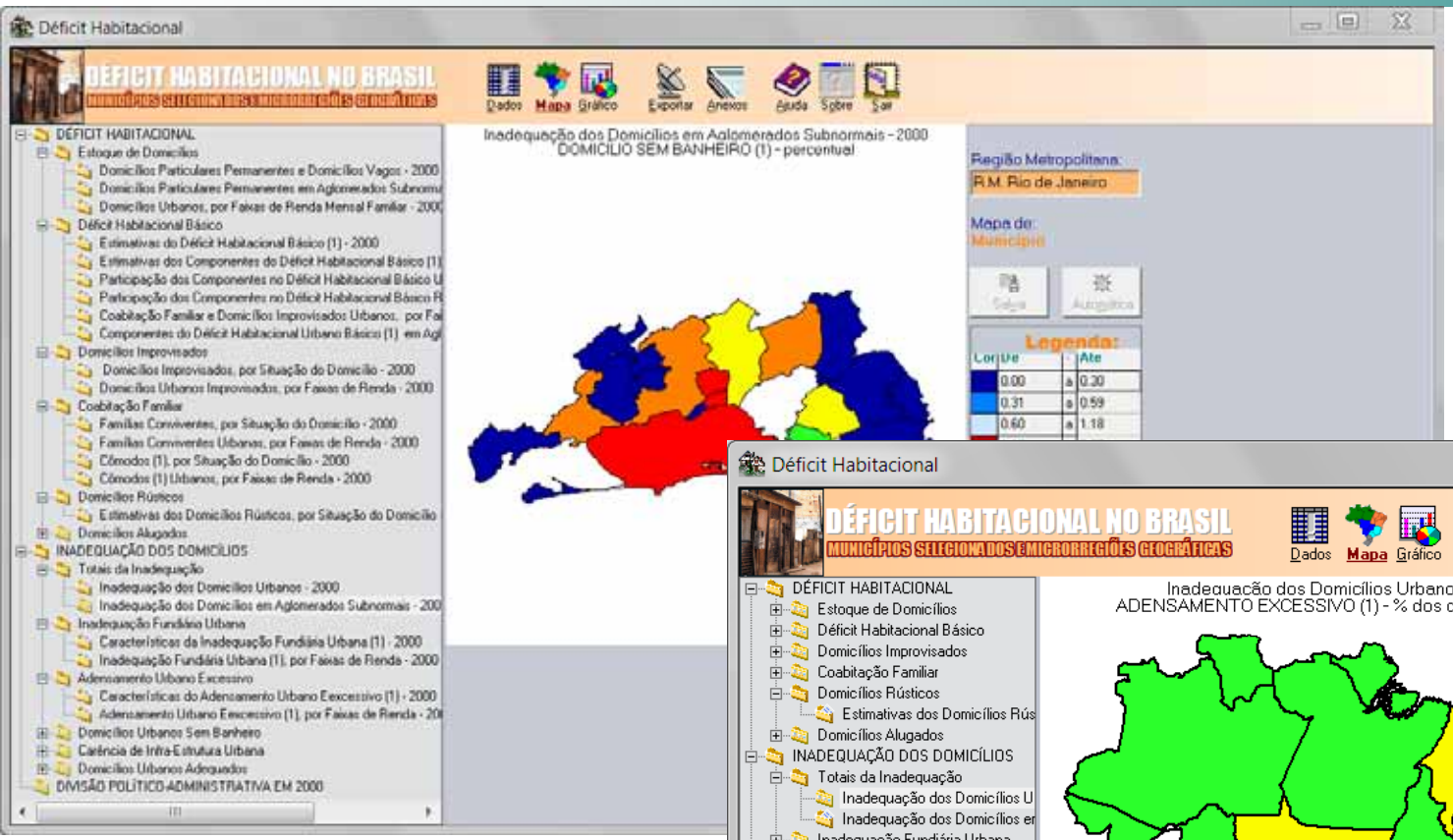
UN-Habitat_DH

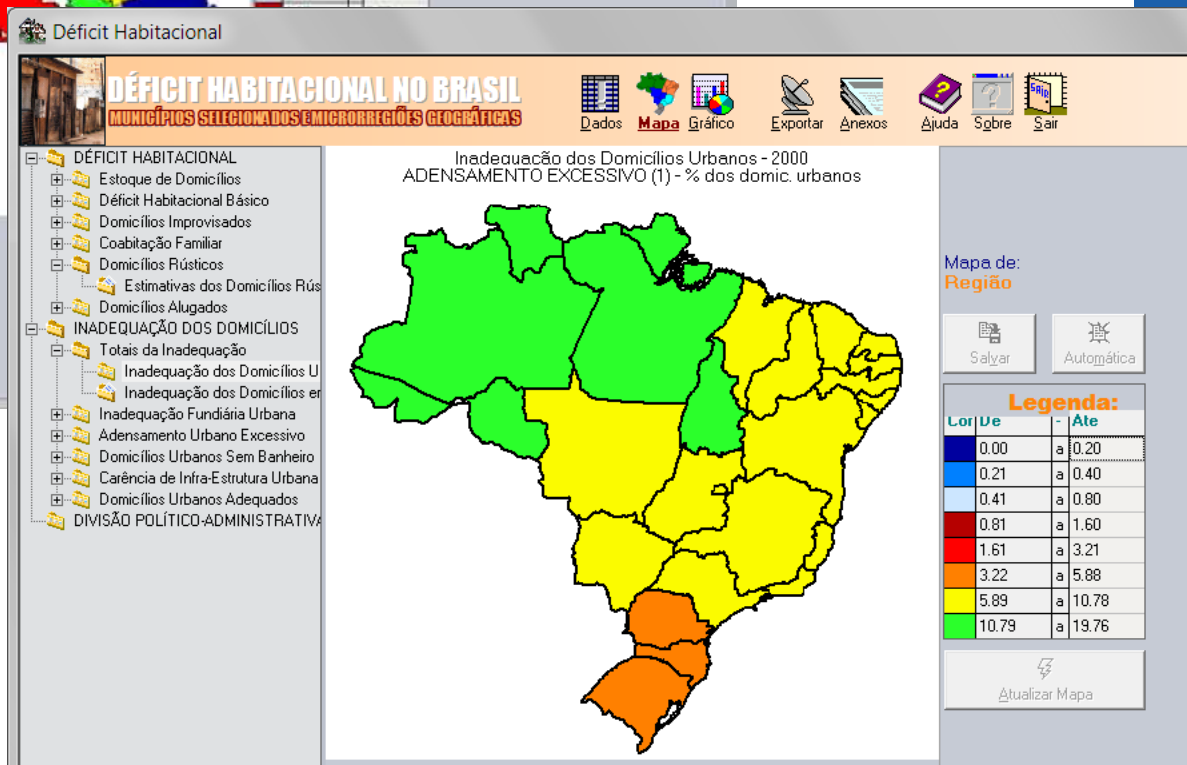


Web applications (IBGE)

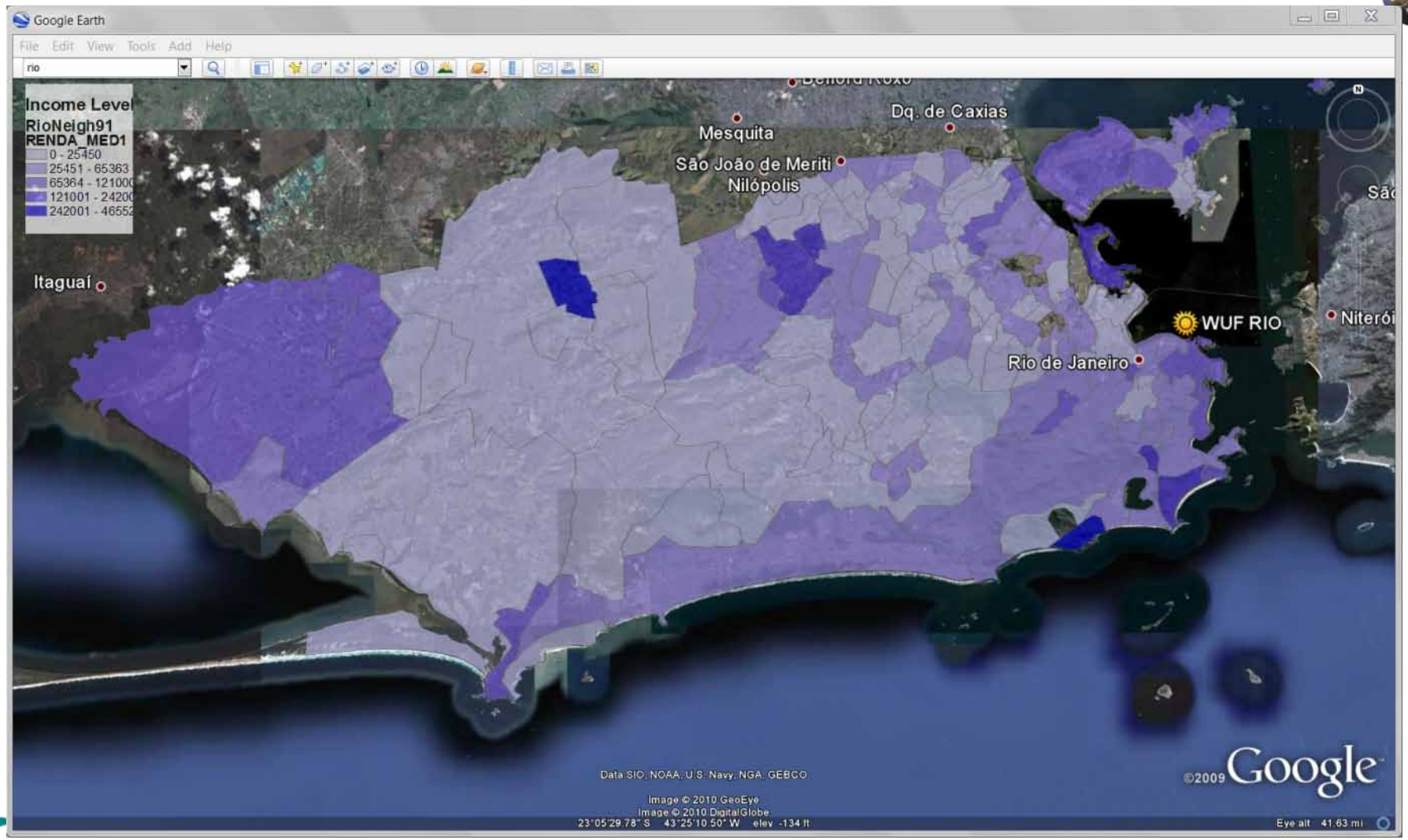


Web applications (www.cidades.gov.br)





Census data (source: IBGE)



Participatory mapping and Information Technology:

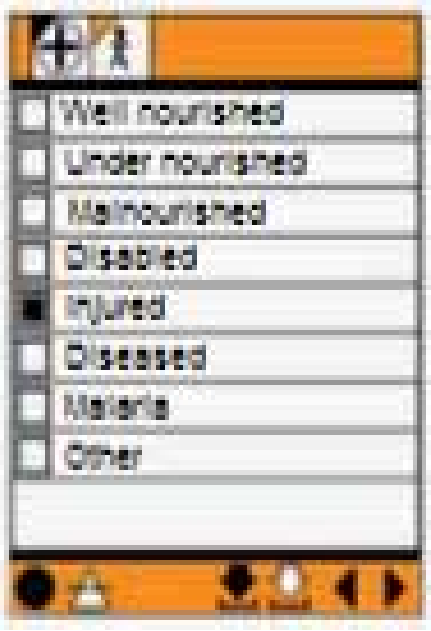
Using free ware to support spatial mapping of Inequity and Vulnerability

Basic data can be collected at local level using friendly IT tools and community-based approaches

CyberTracker Software Features

CyberTracker Screen Designs

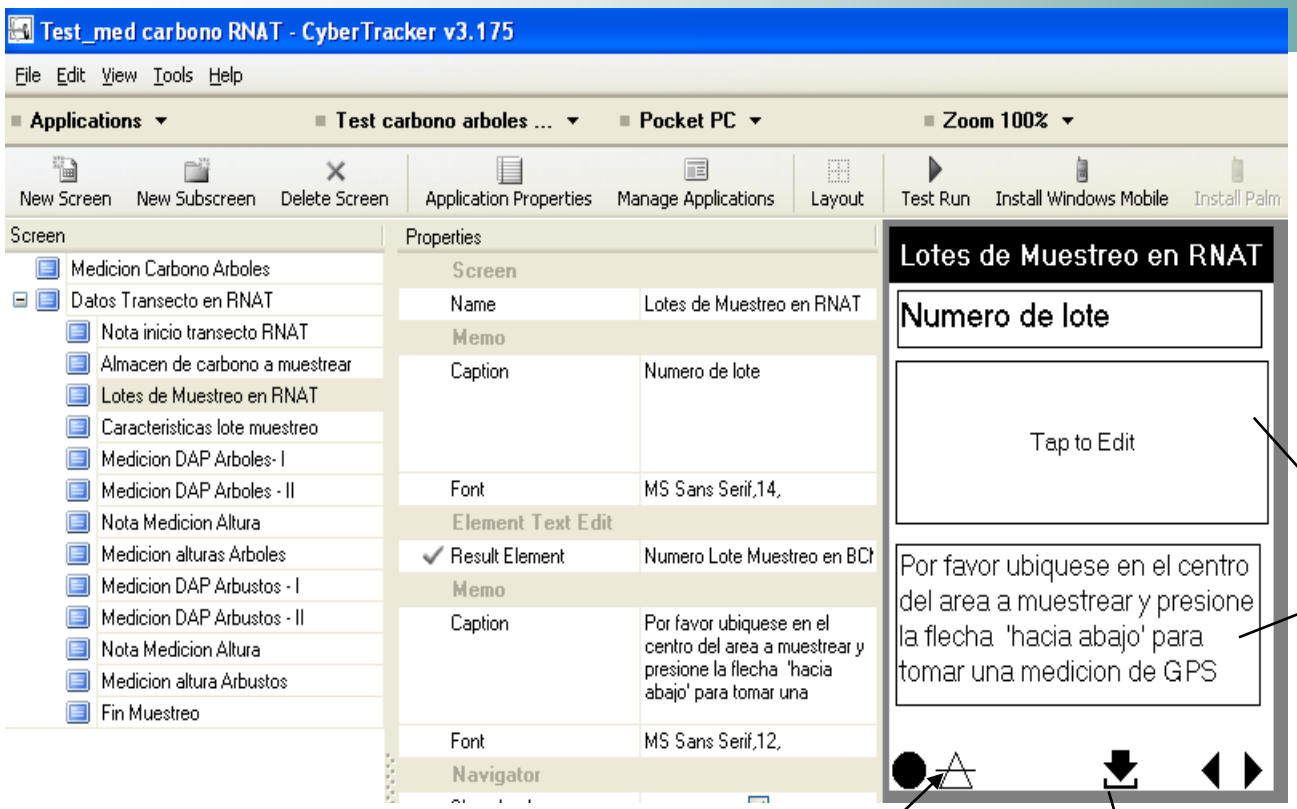
CyberTracker is the most efficient way to gather large quantities of geo-referenced data for field observations at a speed and level of detail not possible before. Observations can be entered with a simple Radio List or a Check List.



Free Software that can be used in an IPAQ or smart phones for collecting several types of data

CyberTracker enables to conduct geo-referenced (rapid) surveys to identify diverse phenomena and its location

Some screen features that support (geo-referenced) data capture

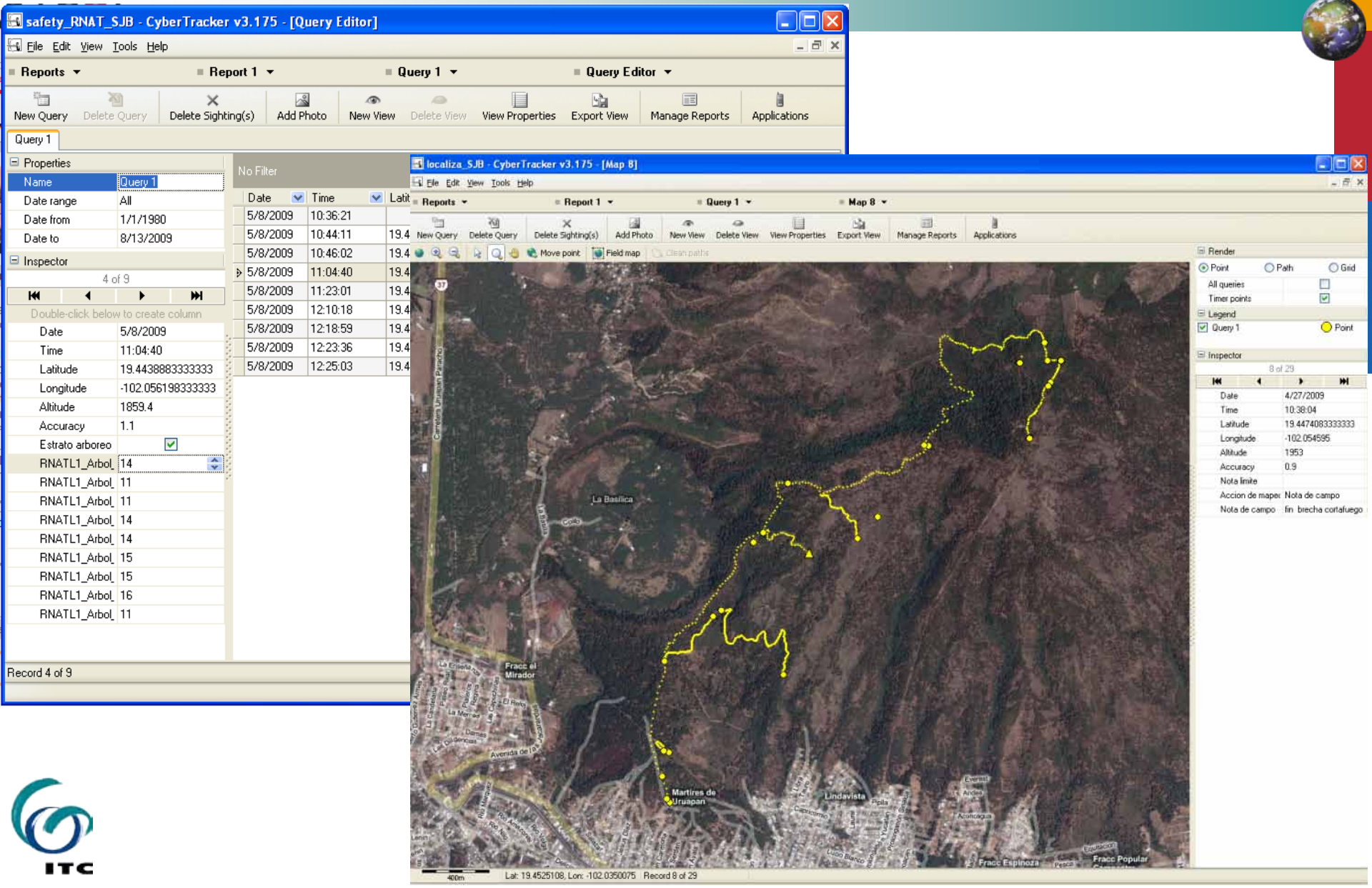


Panels to post information/reminders useful for the data capture process

GPS

Saving geo-referenced information for point location (i.e plot central trees)

Reports: Tables and views to assist displaying and manipulation of data

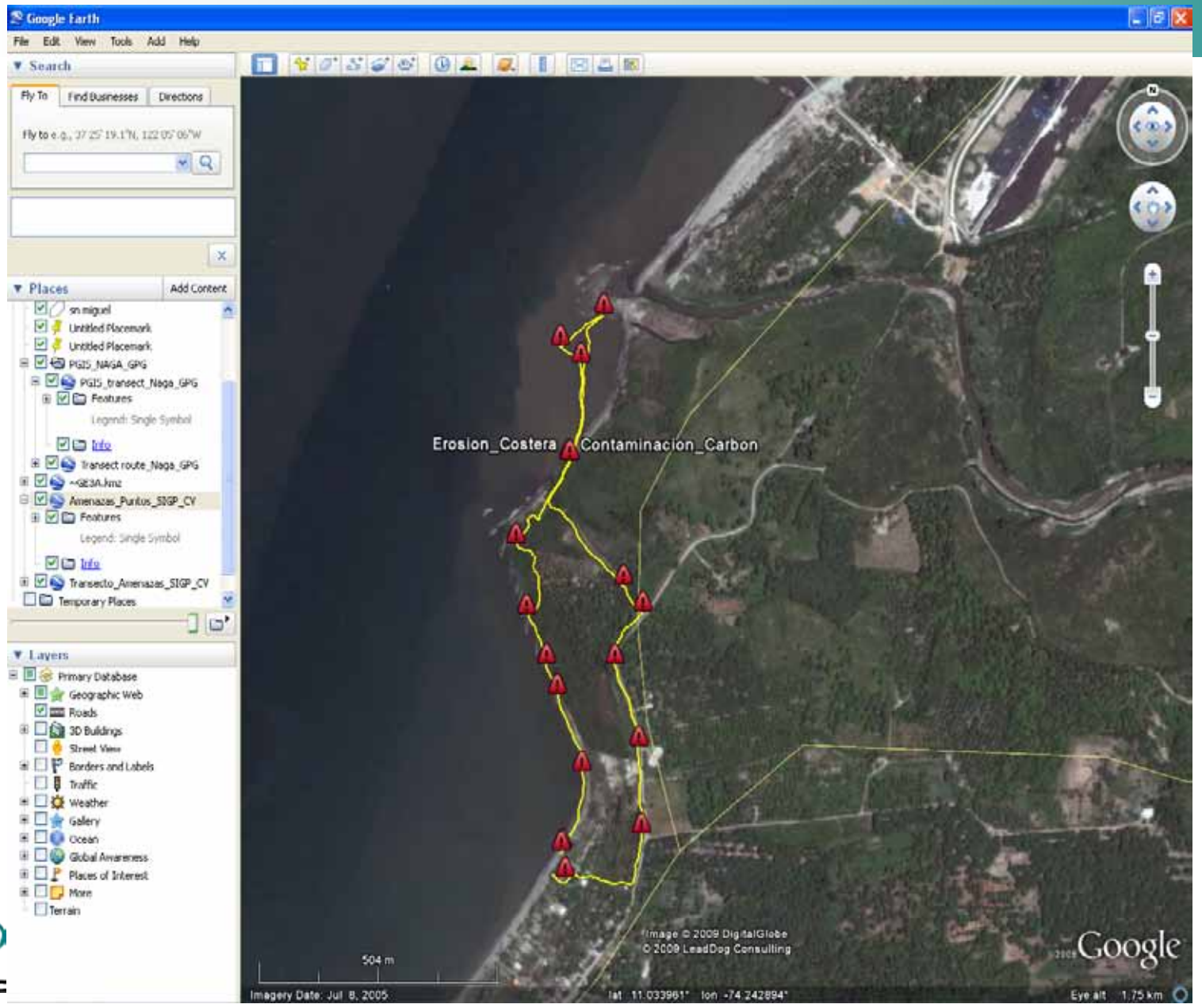


Community Mapping & Profiling: Perception of hazards, vulnerabilities and capacities from different groups (Colombia)

Mapping of hazards: Transects with IPAQS & Cybertracker for identifying coastal erosion, hazardous infrastructure and environmental threats (Colombia)

Hazards
Coastal Erosion
Contamination by Coal Dust
Waste Dumping
Exposed Gas Pipe
Flooding
Other

Mapping of hazards: Hazard-prone areas identified while transecting and discussing with local people displayed in Google Earth



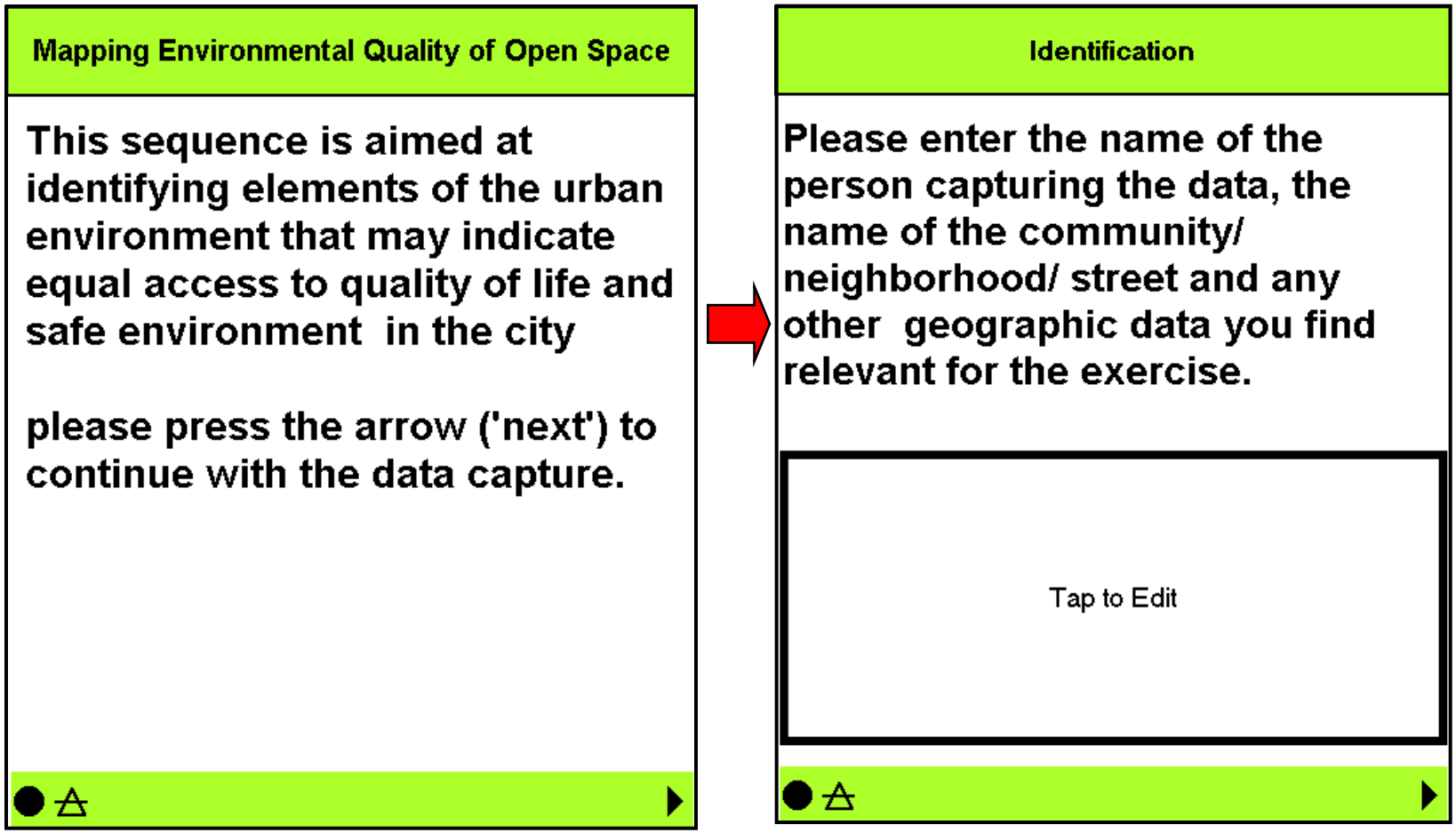
Practical Exercise: Transecting & Mapping Perception of Urban Quality at local level using Cybertracker

Indicators of Urban Public and Environmental Quality

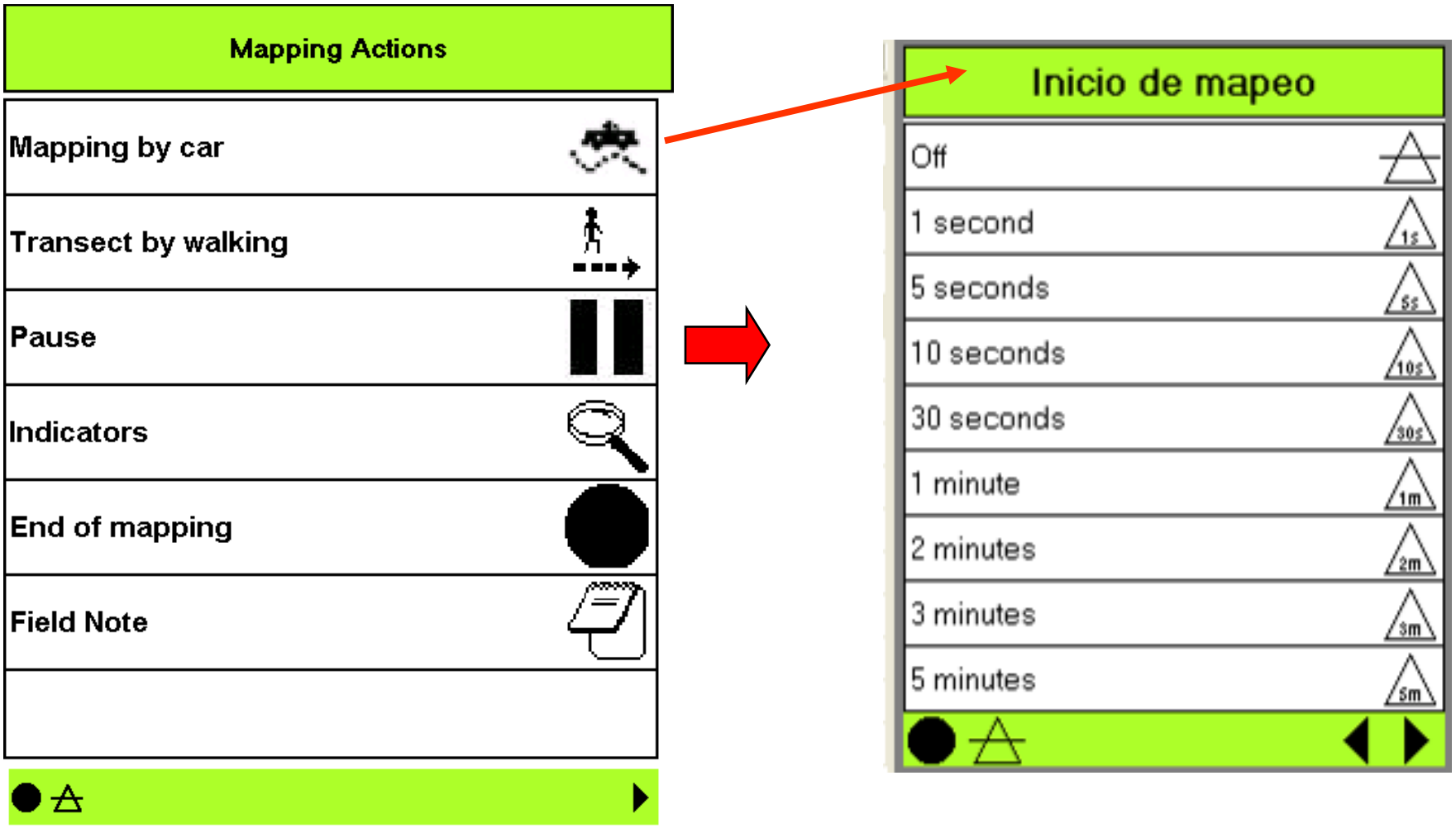
- Quality of the Building Environment
- Quality of Public Open Space
- Perception of Pedestrian Safety
- Environmental Quality of Open Space

Practical Exercise: Transecting & Mapping Perception of Urban Quality at local level using Cybertracker

Step 1. Screens for general data

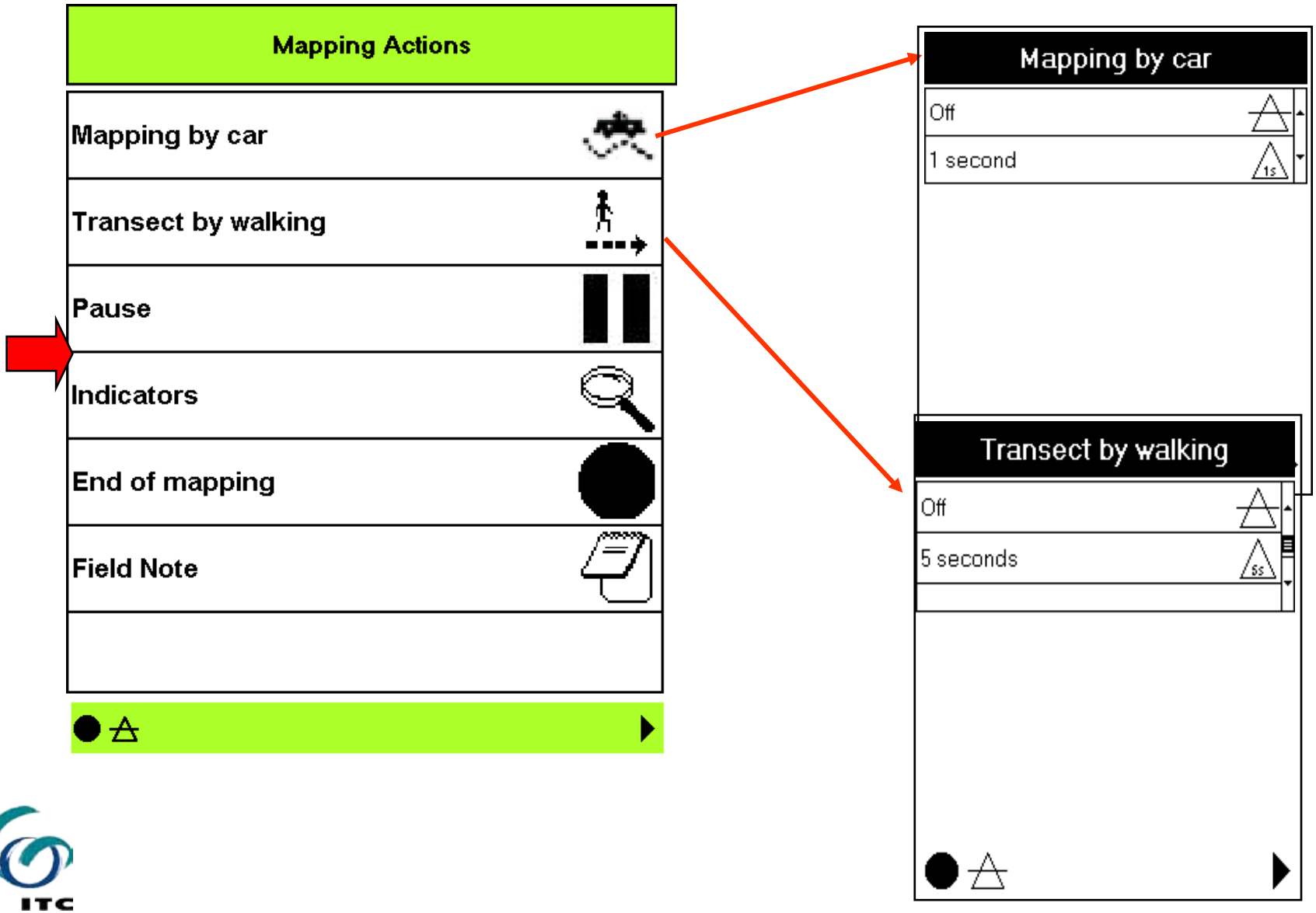


Step 2. Screens for setting a timer for geo-referenced track

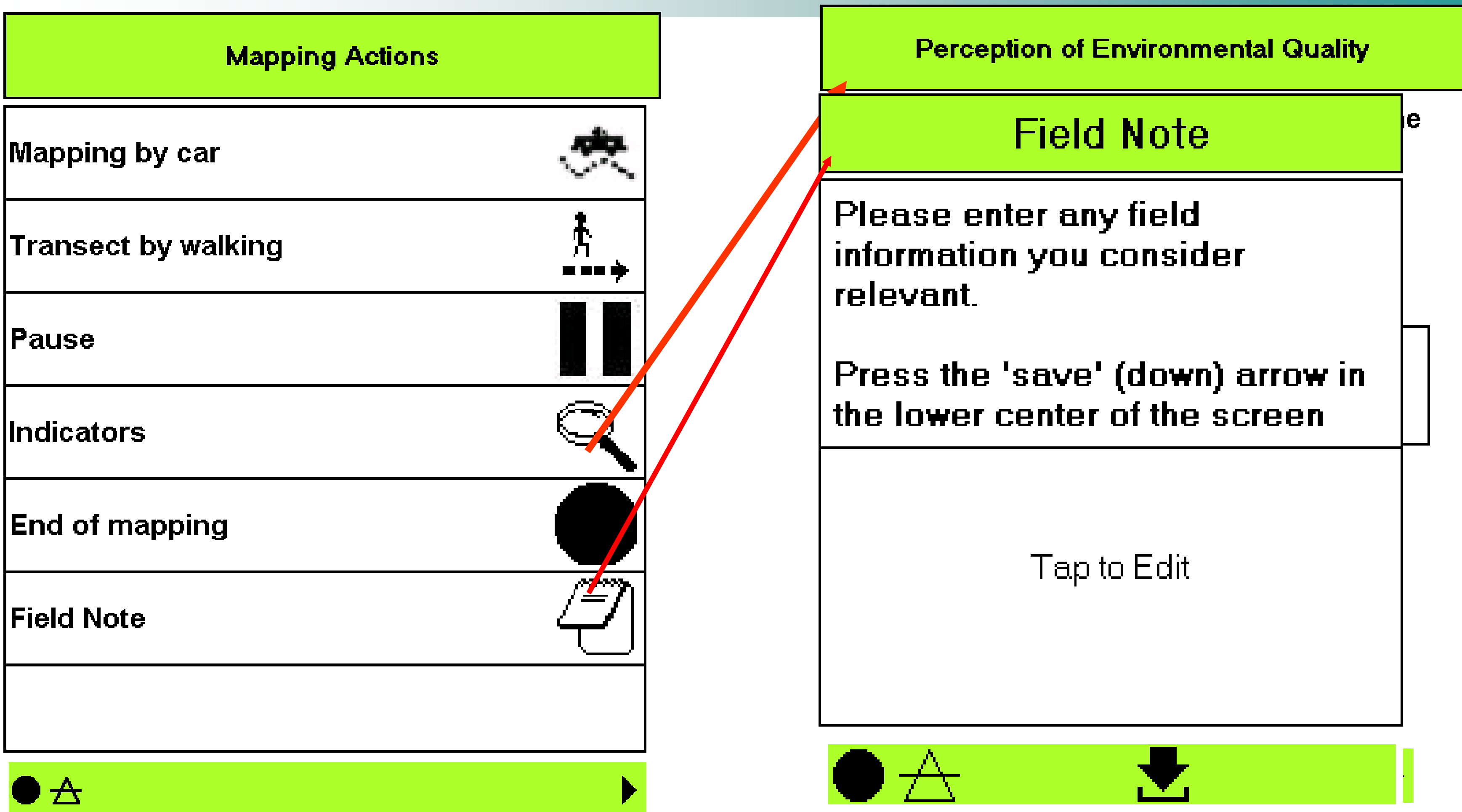


Option 1: The user defines the time span

Option 2: using a pre-defined time span



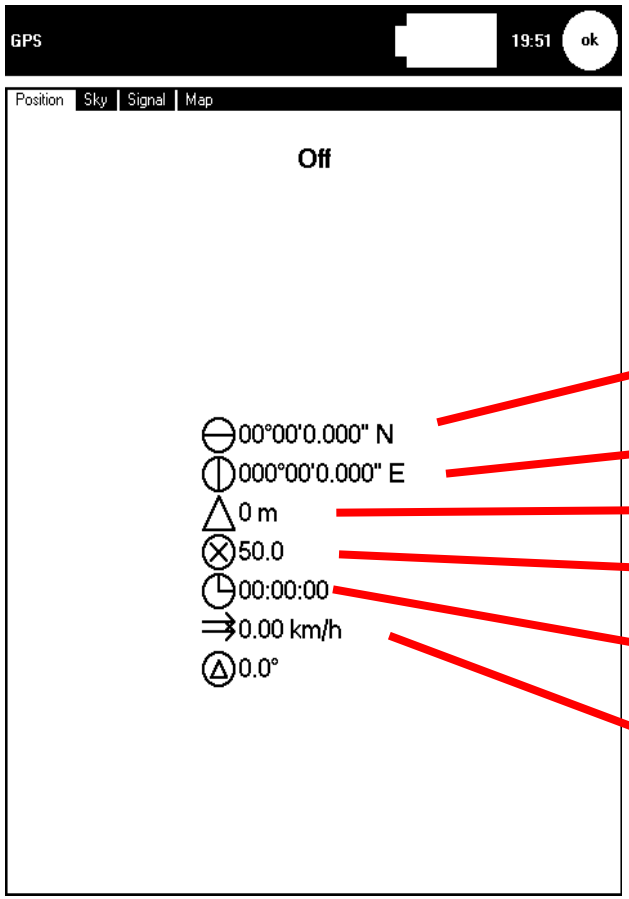
Step 3: Mapping of perception status at community level



Saving geo-referenced information for point location

Screen to assist taking field notes

Step 4A: Verification of Geo-referenced data Acquisition while transecting



Latitude

Longitude

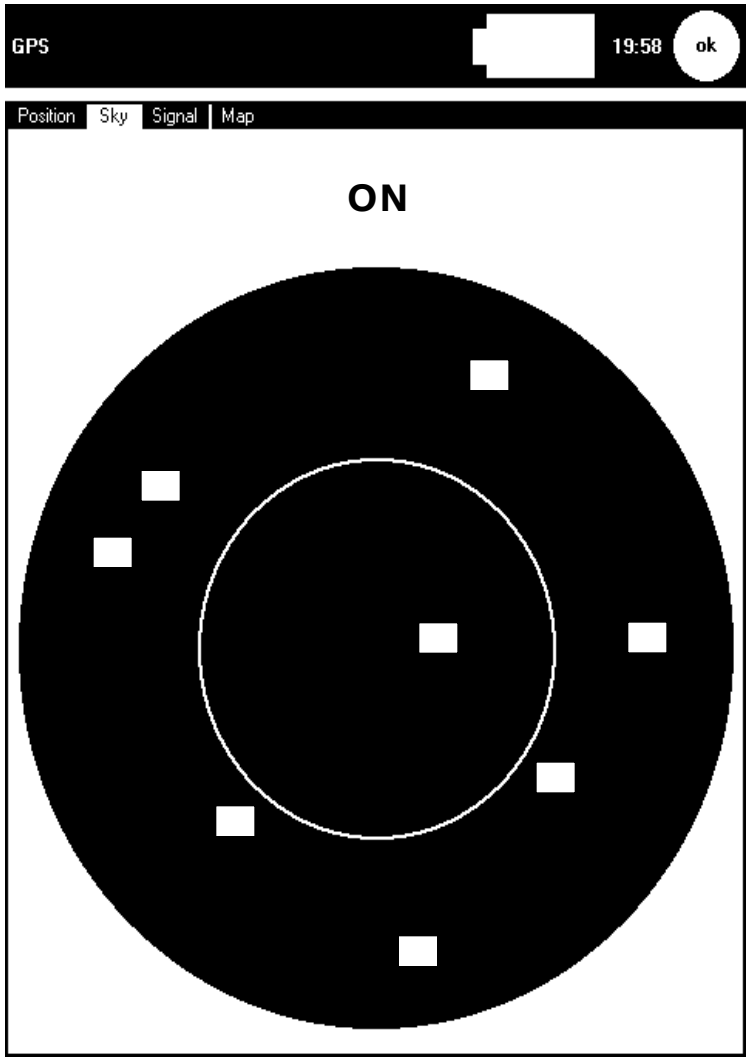
Altitude a.s.l.

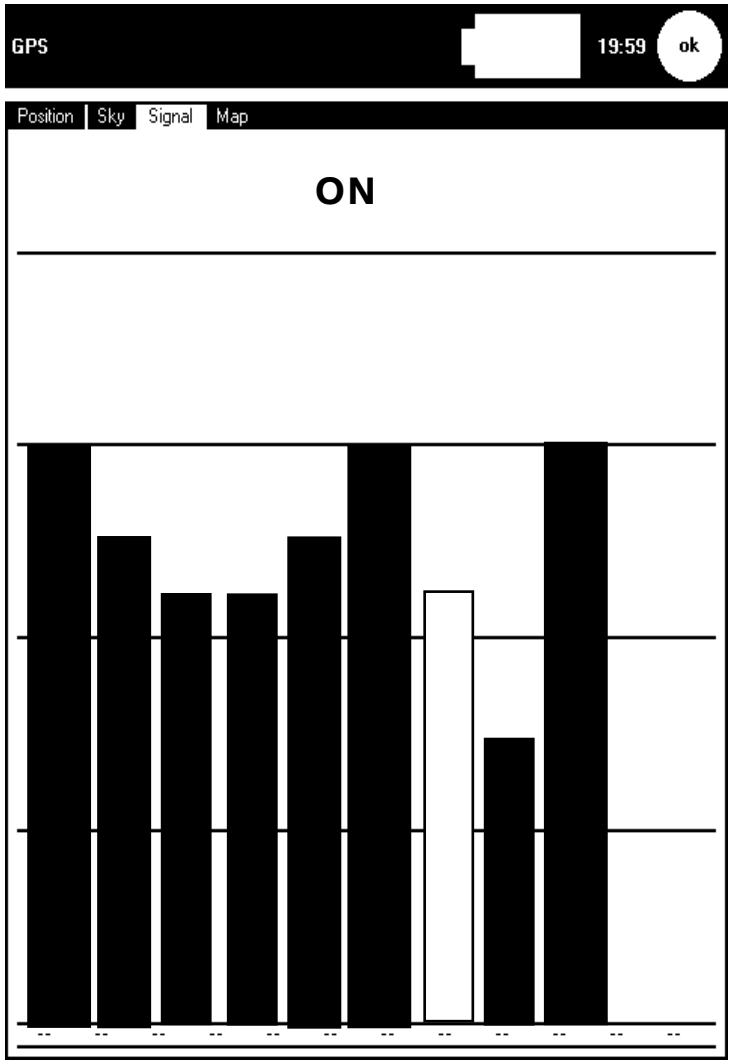
GPS Precision

Local Time (user must set it before synchronising PC with PA).

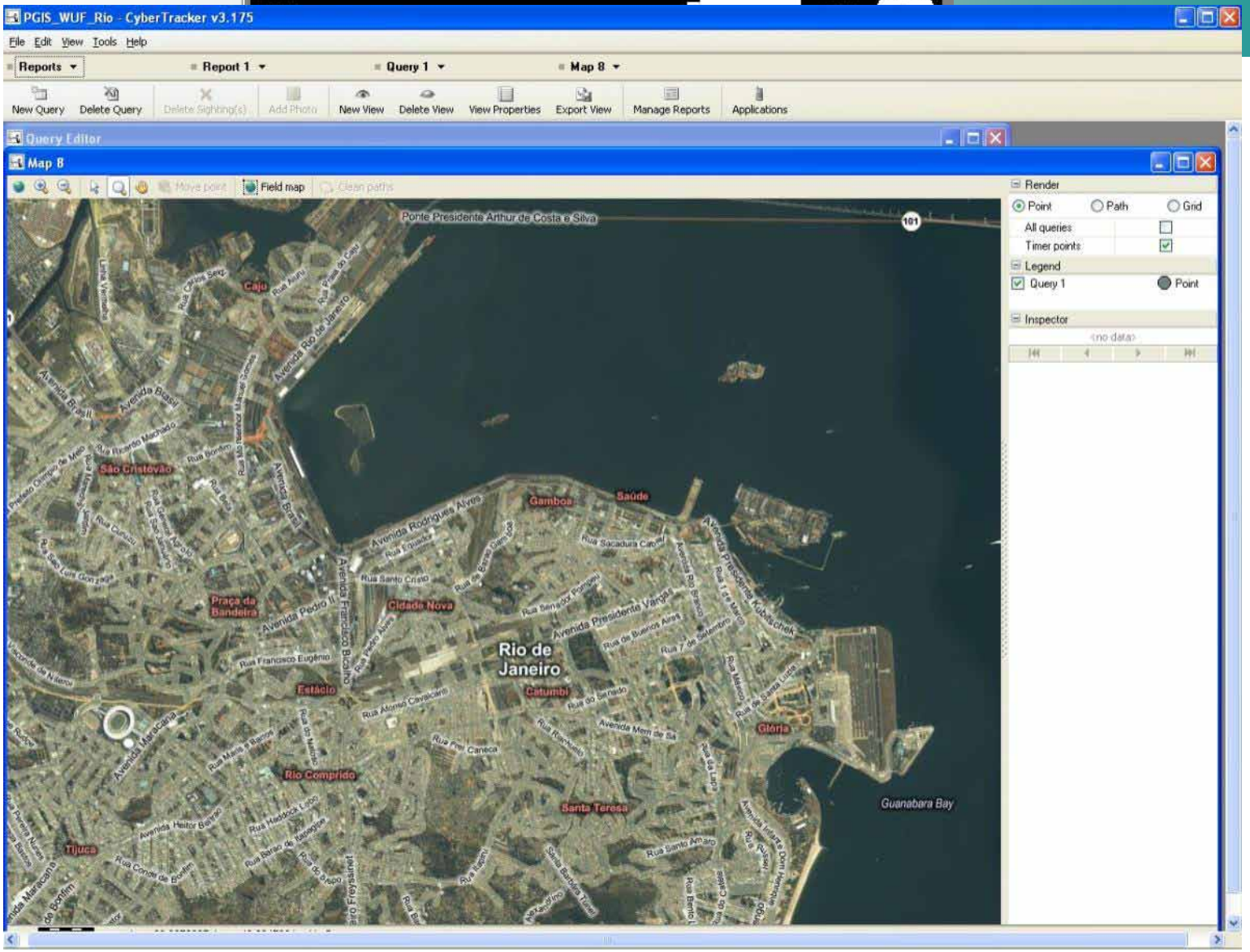
Tracking Velocity (km/h)

Step 4B: Verification of satellite status



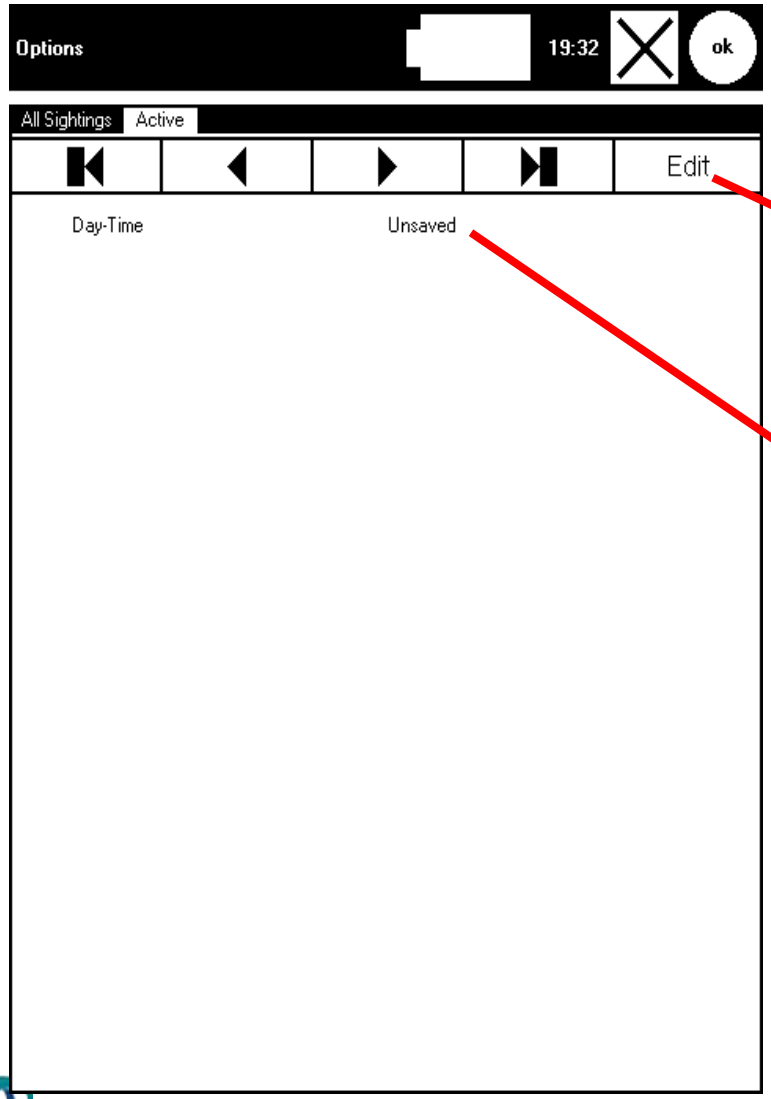


Step 4C: Verification of location



Fieldwork map at different scales

Step 5: Checking and editing data during fieldwork



Editing of data input

verification of data input

Introduction to transect walk

- 10 groups of max. 4 participants
  - Group 1 + 2 / Building quality
  - Group 3 + 4 / Public space quality
  - Group 5 + 6 / Perception of pedestrian safety
  - Group 7 + 8 / Environmental-open space quality
  - Group 9 + 10 / Perception of pedestrian safety (gender)
- 1 facilitator per 3/4 groups
- Duration: 30 minutes
- Instruments for the transect:
  - PDAs / GPS (Digital Camera optional)

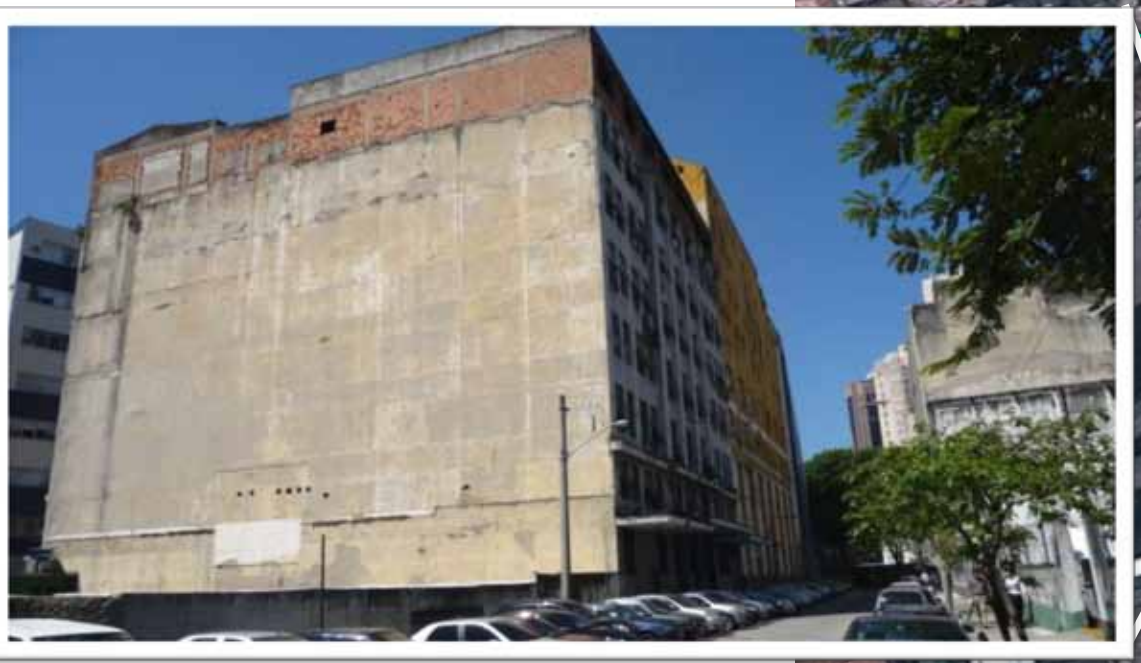
Participatory transect walk area

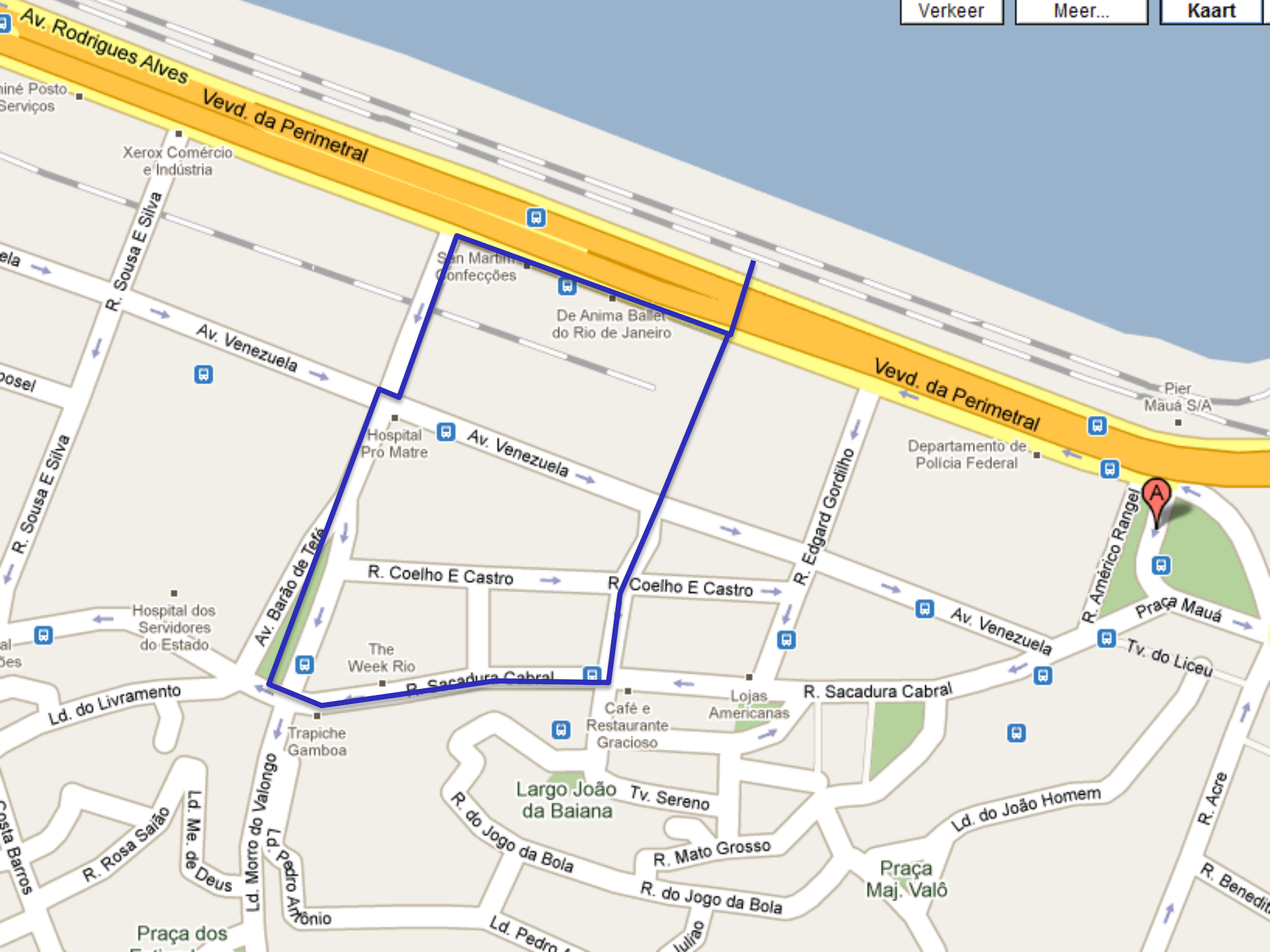
WUF entrance

ITC

Participatory transect walk area

Participatory transect walk area




Verkeer
Meer...
Kaart
Av. Rodrigues Alves
Vevd. da Perimetral
Xerox Comércio e Indústria
R. Sousa E Silva
Av. Venezuela
San Martim Confecções
De Anima Ballet do Rio de Janeiro
Hospital Pró Matre
Pier Mauá S/A
Departamento de Polícia Federal
R. Edgard Gordilho
R. Américo Rangel
Praça Mauá
Tv. do Liceu
R. Coelho E Castro
Av. Barão de Tefé
Hospital dos Servidores do Estado
The Week Rio
R. Sacadura Cabral
Ld. do Livramento
Trapiche Gamboa
Café e Restaurante Gracioso
Lojas Americanas
Largo João da Baiana
Tv. Sereno
R. do Jogo da Bola
R. Mato Grosso
Ld. do João Homem
Praça Maj. Valô
R. Acre
R. Rosa Saião
Ld. Me. de Deus
Ld. Morro do Valongo
Ld. Pedro Antônio
Praça dos

Tips for transect walk

Dynamic of the transect

- Walk > Observe > Stop > Input Data > Walk

When to stop?

- Distance: regularly (at least every 200 meters)
- Time: regularly (at least every 5 minutes)
- **Object: change in conditions (natural breaks)**
  collect 4 to 5 points in total

What to observe?

- Mostly concentrate on the issues related to the group topic and indicators

Download data from Cybertracker

- Steps for downloading the transect data:
  1. Connect PDA to your computer
  2. Open cybertracker software
  3. Go to reports and export to Shapefile format
  4. Export Shapefile to Google Earth format (KML)
  5. View file in Google Earth

Results from transect walk

Demo Google Earth / Street View

- Visualize in Google Earth the Data downloaded from Cybertracker
- Possibilities to overlay more info
  - Compare multi-temporal images
  - Census data
  - How to create new data: polygons and point
  - No time?

Virtual Transect using Street View …

Exercise / Hands On Google Earth

Virtual Transect Walk

- Open Google Earth
- Fly to Iztapalapa, Mexico DF
- Which indicators from the transect walk can work with Google Earth and StreetView?

Exercise / Hands On Google Earth

Social and economic conditions

- Total population
- Population younger than 24 yrs
- Population not born in D.F.
- Education level of population above 15 years old
- Unemployment level
- Income level in minimum monthly wage

Physical conditions

- Quality of wall and roof
- Access to infrastructure (water, sewage, electricity)
- Toilet within the dwelling unit
- environmental quality and public space quality

Source: Análisis sobre la violencia social en la Delegación Iztapalapa; Delegación Iztapalapa: Perfil Sociodemográfico; A.Arango Durán, C.Lara Medina

Exercise / Hands On Google Earth

Virtual Transect Walk

- Open the “Indicators” folder (under Places)
  these contain official census data
- Have a look a these 12 layers and zoom in to the different classes
- Try to find indicators in Google Earth (using StreetView) that are evidence of the class differences in the map overlays

Exercise / Hands On Google Earth

- Do you think that both sources of information complete each other?

- What are reasons for discrepancy?

Group and plenary discussion

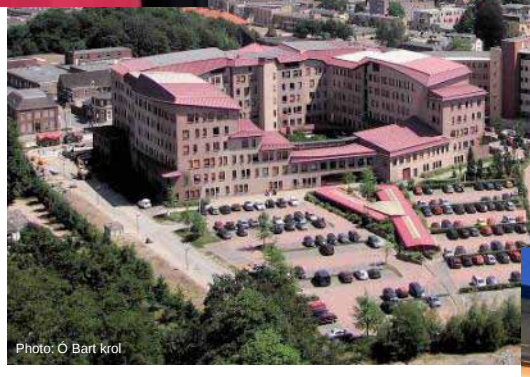
- How will you apply the skills obtained to bridge the gap between different inequality and vulnerability aspects?
- Which decision-making processes would benefit most from the methods you learned?
- What are the limitations of these methodologies?

Closing / further resources

§ Next steps

www.itc.nl
www.iapad.org
www.devinfo.org
www.cybertracker.org

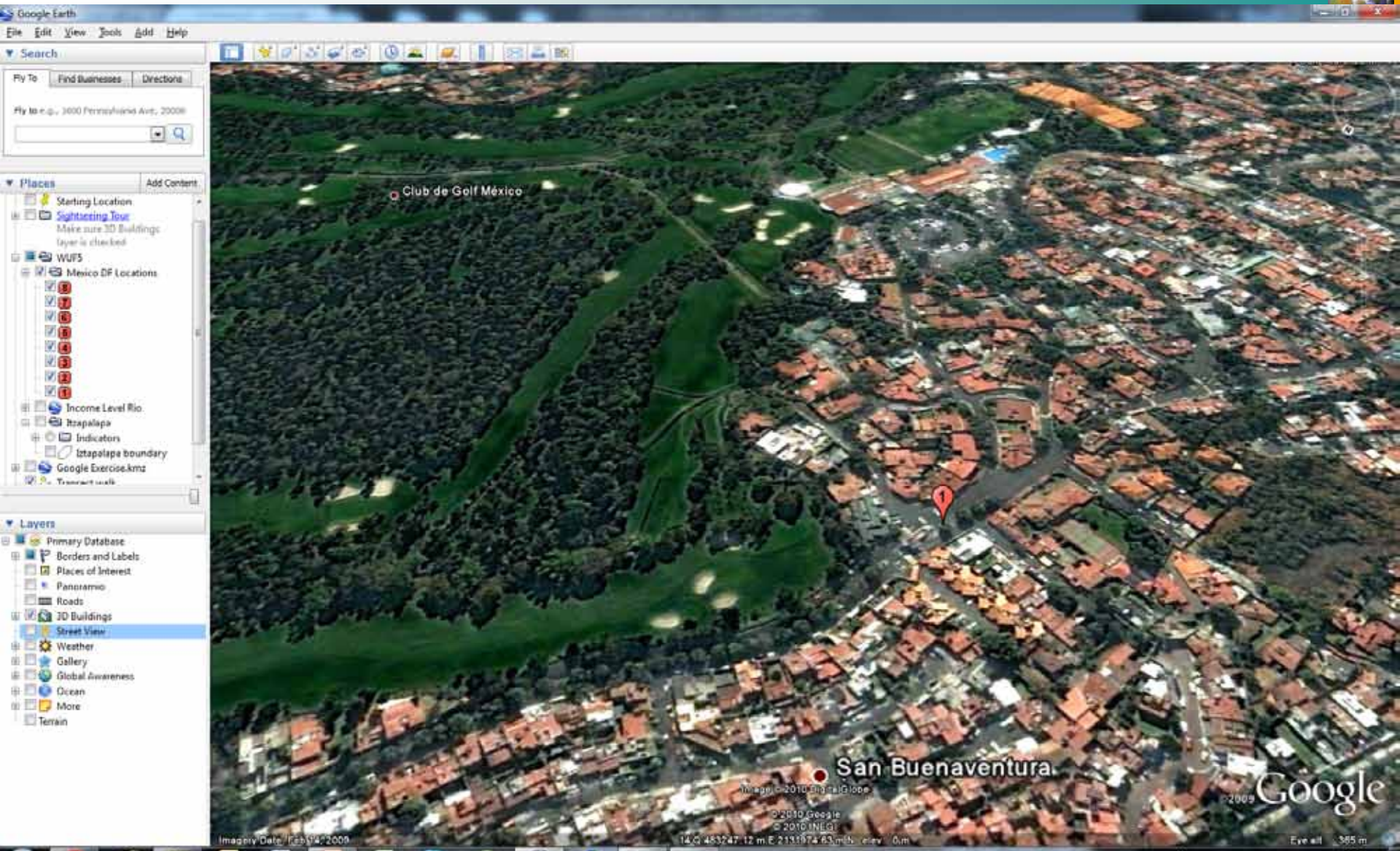
Please fill in the evaluation form!



The end
Thank you!

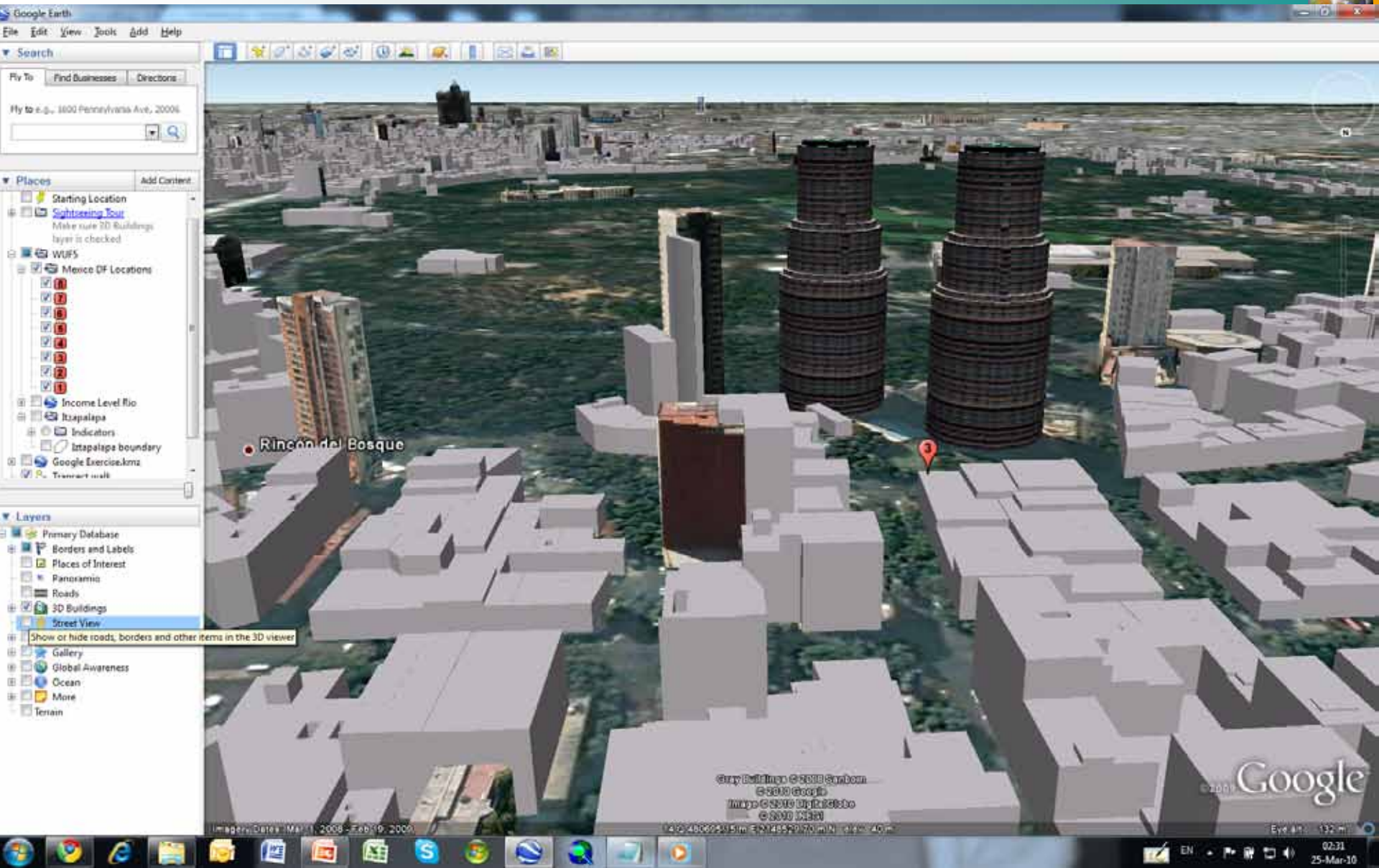
ITC

Google Earth Demo

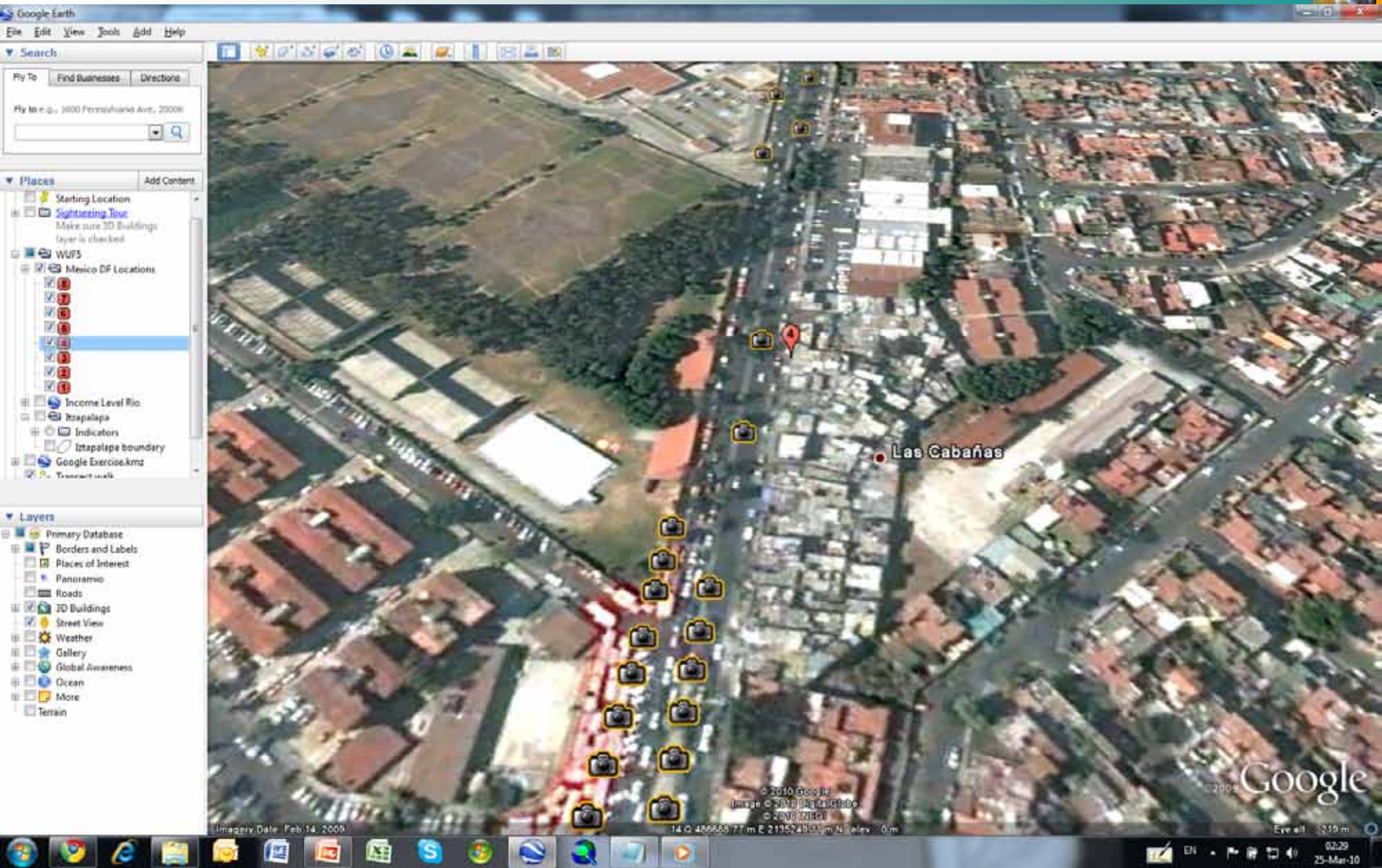


Google Earth Demo

Google Earth Demo



Google Earth Demo



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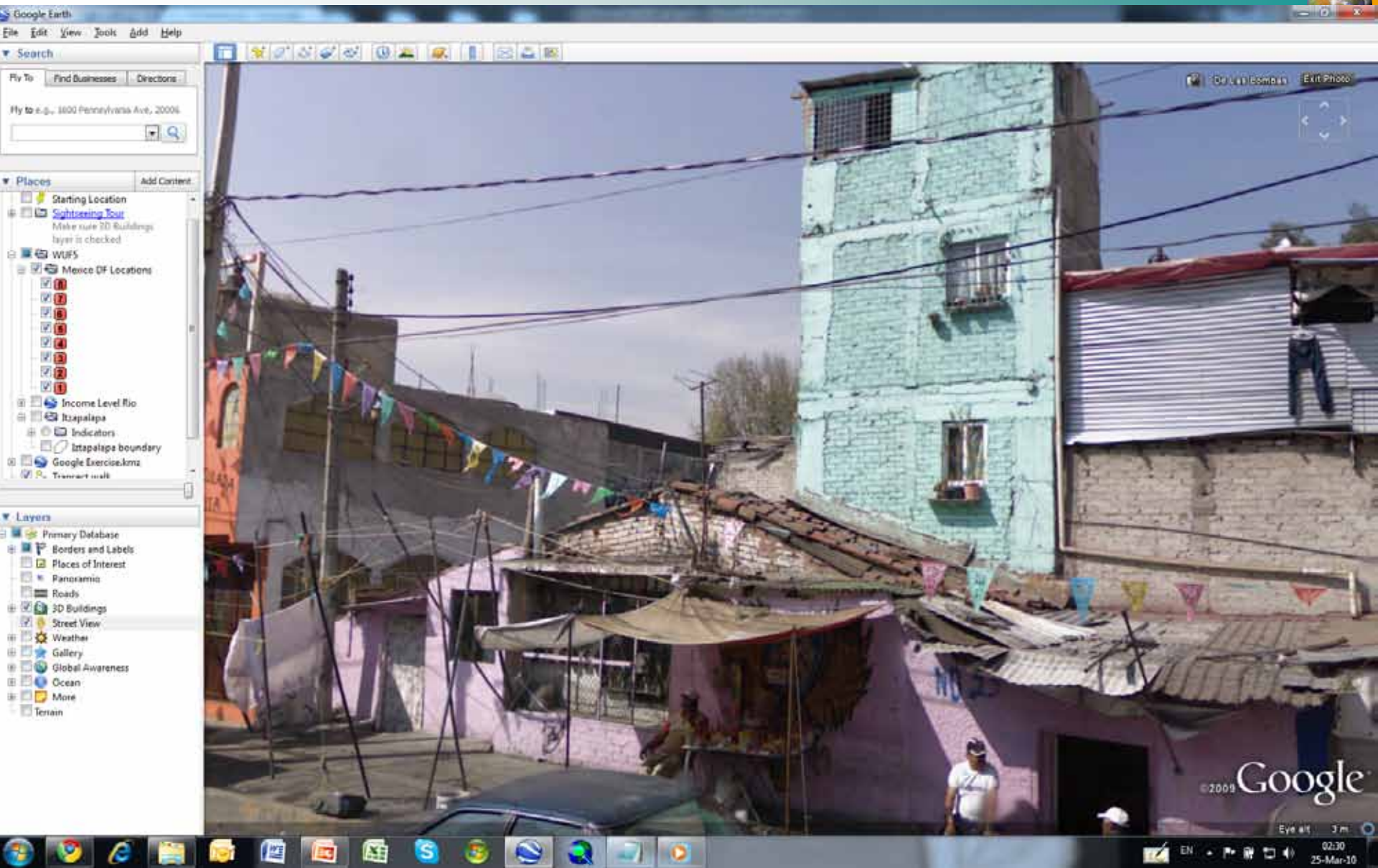
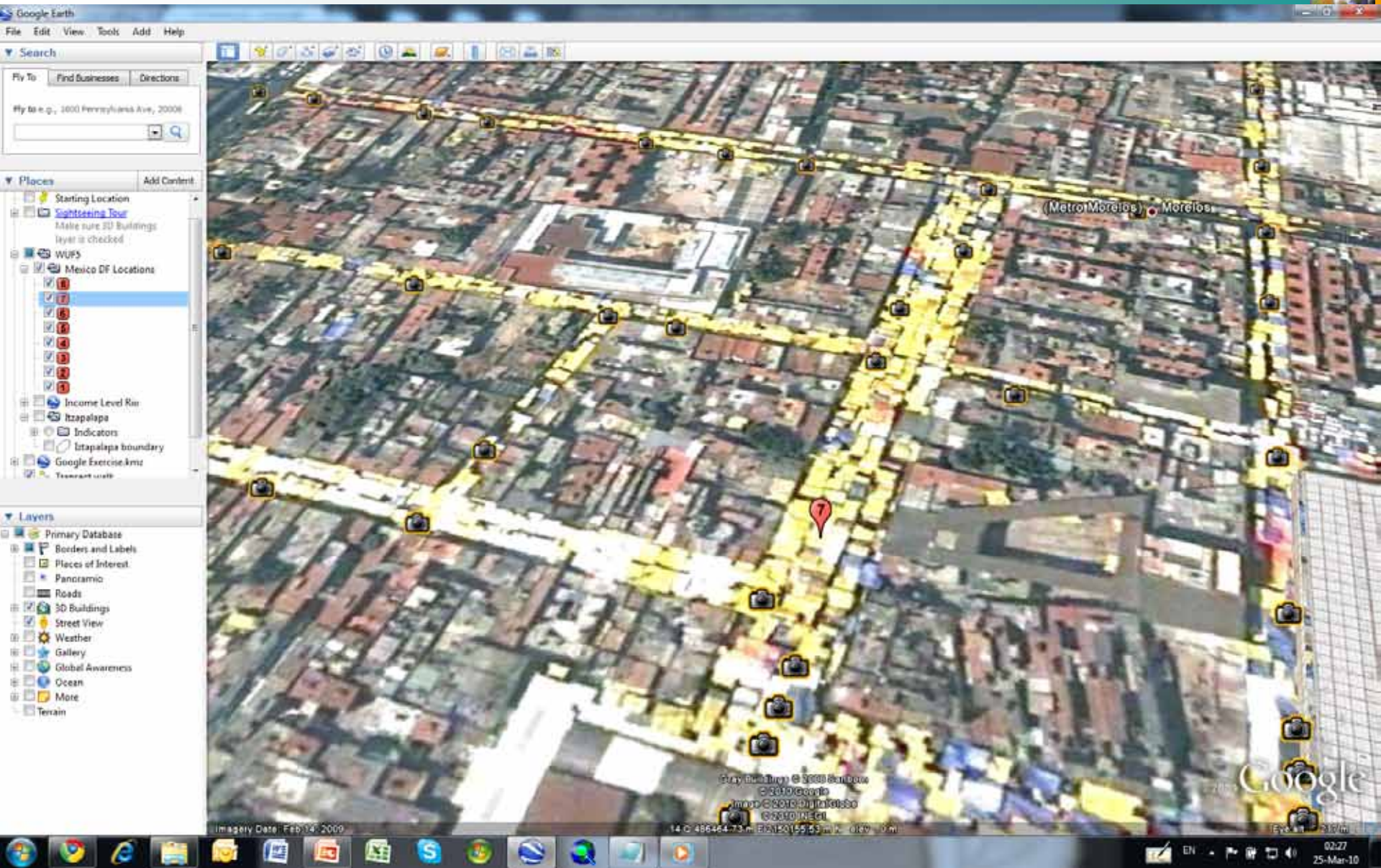
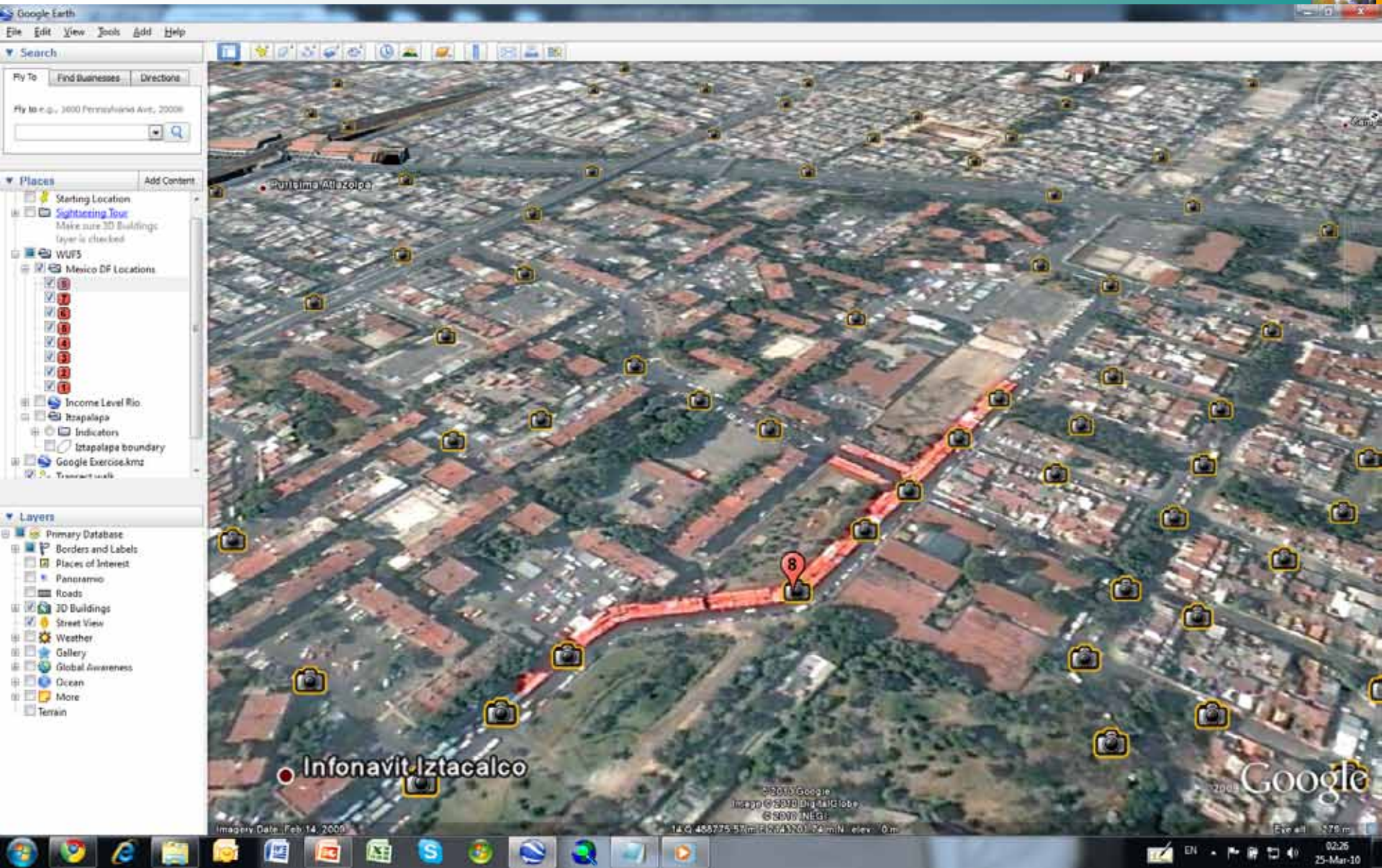


Google Earth Demo



Google Earth Demo

Google Earth Demo



Google Earth Demo