Mapping Out the Social Impacts of Land Use: Soft-GIS and Choice-Based Conjoint Analysis as Integrative Methods

Simon Bell
Susana Alves
Affonso Zuin
This presentation

• Report on work in progress within the structure of PLUREL

• Methodological possibilities
Aims of PLUREL...

• Development of strategies for sustainable urban and peri-urban land use relationships

• PLUREL proposes to do that by
  – developing new strategies and innovative planning and forecasting tools that are essential for developing sustainable rural-urban land use relationships
OPENspace in PLUREL

Derivation of key indicators for social impacts

task 4.3.1

task 4.3.2

task 4.3.3

task 4.3.4

task 4.3.5

task 4.3.6

task 4.3.7

task 4.3.8
• WP4.3 Social, environmental and economic effects of land use change
Quality of Life

- Deliverable 4.5.2:
  - List of key indicators for social impacts:
    Provide a set of QoL indicators to be used with SENSOR

- We are looking for QoL indicators affected by land use change.
Theoretical framework

- Quality of Life & Quality of Life indicators
- Affordances
- Conjoint Analysis & Choice-Based Conjoint
- Soft-GIS
QoL Domains of interest
Possible indicators

• Previous work identified and organised two sets of indicators
  – Being screened and
  – tested according to the objectives of the project
<table>
<thead>
<tr>
<th>Nature and green space</th>
<th>Health</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban air quality</td>
<td>Employment</td>
</tr>
<tr>
<td>Water quality</td>
<td>Income deprivation</td>
</tr>
<tr>
<td>Contaminated Sites</td>
<td>Education</td>
</tr>
<tr>
<td>Transport</td>
<td>Family</td>
</tr>
<tr>
<td>Solid waste</td>
<td>Social participation</td>
</tr>
<tr>
<td>Urban sprawl</td>
<td>Housing</td>
</tr>
<tr>
<td>Employment</td>
<td>Living Environment</td>
</tr>
<tr>
<td>Income equity</td>
<td>Transport</td>
</tr>
<tr>
<td>Housing</td>
<td>Safety</td>
</tr>
<tr>
<td>Human health and well-being</td>
<td>Leisure</td>
</tr>
<tr>
<td>Education</td>
<td>Pollution</td>
</tr>
<tr>
<td>Public safety</td>
<td></td>
</tr>
<tr>
<td>Governance and community</td>
<td></td>
</tr>
</tbody>
</table>
Possible indicators

- **Nature and green space**
  - Green space as percentage of total land area (green space may include protected and unprotected natural areas, parks, vacant land with greenspace value, agricultural land, forest land, parks, gardens, allotments, cemeteries, river and lake shores etc)
  - Total area of environmentally sensitive habitat and percentage of area protected from development (i.e. protected area or covenanted land)

- **Urban air quality**
  - Ambient levels and exceedances for ground-level ozone, PM10, CO, NO, SO₂, benzene
• If PLUREL is interested in Land Use Change across the urban-rural gradient, a list of indicators would be just a start, considering that:
  
  • People and places change
  
  • People’s reasons for living where they do change

Example...
Example...

- **Family A**
  - lives in Nearnature, a suburb of Niceville.
  - upper middle class couple with two children.
  - Father travels to work in his own car to the city centre, half an hour each way, every day.
  - Mother works from home and does gardening.

Source: http://zoepedrera.blogspot.com/
• A large industrial estate is installed nearby
• Consequences:
  - traffic increases,
  - air quality worsens,
  - noise levels increase
  - transport network expands,
  - new commerce and services,
  - new business opportunities and jobs.

Source: http://www.subbrit.org.uk/rsg/features/sfs/new_page_1.htm
• How would the family react? Are they likely to move?

• If they stay, a decade later their children will have left home and conditions around them may have changed even further. Will they still live there? Where would their children have chosen to live?

• Some of the changes may have come unnoticed,
• Some may have not troubled them until a certain point, but later became a problem, and
• Some may have been a nuisance from the very start.
Which indicators to use?

• Indicator sets
  – Are available in many different shapes and sizes,
  – Are usually tailored to suit
    • Authors’ needs,
    • Field of work,
    • Project.
  – Are used for some time then abandoned
    • ‘graveyards of indicators’ (Weber et al, 2001)
The questions are:

- Who lives where and why?
- What are people looking for when they choose where to live?
- Which of these aspects are affected by Land Use Change?
Affordance

- Transactional construct: refers to the environment and the person

- “affordance of anything is a specific combination of the properties of its substance and its surfaces taken with reference to an animal” (Gibson, 1977:67)

- Living in XXX affords A and B different things

- The same attributes of the environment are perceived differently by each of them
Paul Gauguin: The Swineherd, 1888, Oil on Canvas, 74 × 93 cm, Los Angeles, Norton Simon Foundation.
A swineherd:

Low income, physically demanding job
Low level of education
Poor housing
Difficulty finding a wife
Remote location with poor services
Poor transport infrastructure
Long distance to hospital
Low level of cultural activities
Poor shopping facilities
Has to grow his own food
Has a low quality of life

He is likely to move to find a better life unless things change, leading to land use change (rural depopulation etc)
A hobby farmer:
Escaped from the rat-race
Closer to nature
Fresh air
Has a car for transport
Buys shopping over the internet
Likes hiking and bird watching
Has a high income from taking early retirement
Lives in renovated old historical house
Grows organic food to sell to specialist retailers

Has a high quality of life

He has already moved to find a better quality of life. He is contributing to the gentrification of the countryside but also improving aspects there. It is land use change that partly contributed to his move.
How do people choose?

- How important is _______ when you choose where to live?
  - Air quality
  - Safety
  - House price
  - Nearness to green spaces
  - Etc

Not important                                                  Very important

- It is very likely many of these would be rated ‘very important’
How do we get around that?

• A procedure that
  – Mimics real-life choice processes more accurately;
  – Act as a predictor tool
  – Does not require a very large sample
  – Allows choices to be examined per different groups (segments)
Conjoint Analysis

- Is a group of methods that address many of those issues;
- Based on trade-offs people are prepared to make among attributes;
- Allows us to have a predictor tool: Market Simulator;
  - MS shows likelihood of choice according to different scenarios,
  - By different segments.
Attributes and levels - example

• **Nature and green space**
  – Green space as percentage of total land area (green space may include protected and unprotected natural areas, parks, vacant land with greenspace value, agricultural land, forest land, parks, gardens, allotments, cemeteries, river and lake shores etc)
  – Total area of environmentally sensitive habitat and percentage of area protected from development (i.e. protected area or covenanted land)

• **Urban air quality**
  – Ambient levels and exceedances for ground-level ozone, PM10, CO, NO, SO$_2$, benzene
• **Nature and green space**
  – There are green spaces and nature within walking distance
  – Green spaces and nature can be reached by car
  – No green spaces and nature in the vicinity

• **Urban air quality**
  – Excellent – no pollutants or smells
  – Adequate – pollutants and smells to a minimum level
  – Fair – pollutants and smells can be noticed but bearable
  – Bad – pollutants and smells cause disturbance
CBC interview

Quality of Life - choosing where to live

This survey is part of the PLUREL project.

Thank you for willing to participate in this study. All your answers are anonymous and will be kept secret, being used solely for the present study.

Please click “Next” to start.

If you would like to know more about PLUREL, please visit www.plurel.net.
Quality of Life - choosing where to live

Are you originally from the country where you live?

☐ Yes
☐ No

Next

0% 100%

Quality of Life - choosing where to live

Where are you originally from?

Please select from the list below

Next

0% 100%
Quality of Life - choosing where to live

In the next set of questions, we will ask you to choose one out of three profiles of residential areas presented. This will happen several times. Consider this situation:

Let’s suppose you are moving home.

From the characteristics shown in the columns, and considering all else equal, which of these areas would you rather move to?

You don’t need to remember or think about your previous choice to answer each time. Just pick one and click “Next.”
Quality of Life - choosing where to live

If these were your only options, which of these places would you choose to live?
Choose by clicking one of the buttons below:

- Waste disposal and recycling facilities are within walking distance
- There are a few job opportunities in the area
- Excellent water quality (home supply)
- The area is far from the main road network
- Air quality is poor

- There are no waste disposal and recycling facilities within reach
- There are no job opportunities in the area
- Reasonable water quality (home supply)
- The area is served by a limited road network
- Air quality is excellent

- Waste disposal and recycling facilities are reached by car
- There are many job opportunities in the area
- Poor water quality (home supply)
- The area is served by a large road network
- Air quality is fair

Next
Quality of Life - choosing where to live

We would now like you to answer some questions about yourself.

Are you

- Female
- Male

Next

0% 100%
Which of the following descriptions best applies to your household?

- Living alone
- Two or more people, all different family units
- Couple, no children, no other family units in the household
- Couple, no children, other family units living in the same household
- Couple, one or more dependent children, no other family units
- Couple, all non-dependent children, no other family units in the household
- Couple, with children, with other family units in the household
- Lone parent, living with one or more dependent children, no other family units
- Lone parent, all non-dependent children, no other family units
- Lone parent, other family units
- Other
CBC will give us

• A very accurate understanding of people’s preferences and choice priorities
How do we place these affordances?

• Participative Geographical Information
  – Local and localized information which is generated through the interaction between environment, individual and community

• Soft-GIS (Marketta Kyttä & Maarit Kahila)
  – Geographical Information produced by the users of the environment,
  – usually empirical and,
  – can be collected and processed as GIS
To participate in the study we need some background information. They are asked only to help analyzing the results. The given information is confidential: the specific answers cannot be traced to an individual participant of the study.

The answering will take about 30 minutes. Please answer to every question. You have to answer to the questions marked with "*" in order to continue answering.

Date of birth *
Year: ____________

Gender *
- female
- male

The family type *
- please choose --

Number of children
- 0 - 6 years
- 7 - 17 years
- over 18 years

Profession
- please choose --

District *
BACKGROUND INFORMATION 2/2

Housing type
- rented house/apartment

House type *
- apartment building (2-4 floors)

The size of the apartment/house
- 100 m²

Number of rooms (excluding the kitchen)
- 3 rooms

Time of housing (please answer to all of the questions):
- In the current apartment/house [ ] years
- In the current neighbourhood [ ] years
- In the current town/city [ ] years

The most important environment during my childhood was
- in a city centre or close to it

A situation where I answer to the questionnaire
- at work

You can choose an alias and a password to be able to continue filling in the questionnaire if, for example, you don’t have time to complete the questionnaire or if...
PERSONAL QUALITY FACTORS

Please mention 1 - 3 positive quality factors for living environment that you personally value.

I find it important that the environment is
- Child-friendly

I find it important that the environment is
- Unpolluted

I find it important that the environment is
- Safe

Please continue  Previous page  End
THE FACTORS THAT REDUCE THE QUALITY OF THE ENVIRONMENT

In addition to the positive quality factors there can also be factors that we attempt to avoid in our environment. Please name 1 - 3 those kind of factors, that you personally feel reducing the quality of the environment.

I find it important that the environment is NOT
- Polluted
- Unsafe
- Overcrowded

Please continue  Previous page  End
THE LOCATION OF HOME

Please mark first your home to the map.

Click with the mouse first the smaller map of Järvenpää approximately on the place where you live. Then the right part of Järvenpää appears to the larger map of Järvenpää. This larger map you can move to all directions half screen at the time by clicking the arrows around the map. Mark your home to the larger map by clicking the right spot. Then a home symbol appears to the map. If the location was not correct, you can mark the location again. Here you will find some more instructions.
WORK AND STUDY

Please mark Likewise your work or studying place if you have one. Please notice that locations outside Järvensää are marked to the map of Finland. Then click first on the smaller map that represents the whole Finland, approximately the place where your work place is located. A more detailed map will appear to the screen. Please estimate then the location of the work place roughly. Here you will find some more instructions.
QUALITY FACTOR 1/3

The positive quality factor that you mentioned was: Child-friendly

How does this factor come true in your environment?
Not at all ★ ★ ★ ★ ★ Totally

How important is this quality factor to you personally?
Not important ★ ★ ★ ★ ★ Very important

Can you influence on the existence of the factor in your neighbourhood?
Not at all ★ ★ ★ ★ ★ Very much

Please continue  Previous page  End
POSITIVE QUALITY FACTOR 1: CHILD-FRIENDLY

Please mark to the map the place, area or route, where this quality factor is located. If it is impossible to locate the factor, press continue-button. Here you will find some more instructions.
NEXT WE WILL ASK SOME MORE INFORMATION ABOUT THE LOCATION THAT YOU JUST MARKED.

The location is
- a place
- an area
- a route

Please describe the location
Park

What do you normally do in the location?
Take children to play

To what degree does the quality factor come true in this location?
Not at all
- Completely

How important is location to you personally?
Not important
- Very important

How often do you visit the location?
Weekly

How do you get there normally?
By foot

How long does it take to get there?
Less than 10 minutes
THE FACTOR THAT REDUCES THE QUALITY OF THE ENVIRONMENT 1/3

You mentioned the following factor as reducing the quality of the environment:
Polluted

Does this factor come true in your living environment? OR if you meet the lack of this factor: How much do you feel that this factor lacks in your environment?
Not at all ☐ ☐ ☐ ☐ ☐ Very much

How important is it to you to avoid this factor? OR if you meant the lack of this factor: How important it is to you that this factor would exist in your environment?
Not at all important ☐ ☐ ☐ ☐ ☐ Very important

Can you influence on the existence of the factor in your neighbourhood?
Not at all ☐ ☐ ☐ ☐ ☐ Very much

Please continue   Previous page   End
FOUR QUESTIONS CONCERNING THE CITY OF JÄRVENPÄÄ

Which things originally made you to move to Järvenpää (Please answer only if you have lived also in some other places)?

Which things make you stay in Järvenpää?

Which things make you consider moving away from Järvenpää?

Which things would you like to change in Järvenpää?
SERVICES: GROCERY STORE

Please mark to the map, where you mainly do (your family mainly does) daily grocery shopping? Here you will find some more instructions.
YOUR WELLBEING

We would finally like to know how your health has been in general, over the past few weeks.

Please answer the following questions by circling the number that best applies to you.
Have you recently...
Been able to concentrate on whatever you are doing?
   [ ] Please choose --
Lost much sleep over worry?
   [ ] Please choose --
Felt that you were playing a useful part in things?
   [ ] Please choose --
Felt capable of making decisions about things?
   [ ] Please choose --
Felt constantly under strain?
   [ ] Please choose --
Felt that you couldn’t overcome your difficulties?
   [ ] Please choose --
Been able to enjoy your normal day-to-day activities?
   [ ] Please choose --
THANK YOU FOR PARTICIPATING IN THE STUDY!

Lottery

If you wish, you can take part in the lottery, where you can win a digital camera and maps of Jarvenpaa. Your contact information will not be connected to the answers of the questionnaire. The winner will be informed personally.

Name:

Address:

Phone:

Free word

Here you can comment the study and the questionnaire and the themes of the research. You can also send a message to the researchers.
Limitations

- Lengthy interviews
- Large amount of data
- Analysis – complex
- Soft-GIS is feasible at the local level, using preferences elicited through CA
Next steps

- Piloting of the CBC interview
  - PLUREL General Assembly in Warsaw

- Testing Adaptive Conjoint

- Testing the ‘tribes’ segmentation
Thank you

Affonso Zuin
a.zuin@eca.ac.uk
First approach to household types

Adapted from
Labour Force Survey - UK
User Guide – Volume 8 pg 24
Other concerns

- Web
  - limits sample to web users
- Laptop based
  - 'paper'
  - error may come from the different format
  - student --> family
  - snowball sample
  - how do we get to them otherwise?
- Random vs recruited
  - methodical
  - every 10th person passing by
  - Enter Sub-topic
- Sample bias
  - requires
  - careful training of interviewers
  - detailed briefing