Key conditions for implementing a responsive landscape planning approach

Prof. Dr. Adrienne Grêt-Regamey
PLUS – Planning of Landscape and Urban Systems, ETH Zürich, Switzerland
The dawn of big data era

Per year: 5 ZB of data = total land surface covered of print issues of one journal.

Per month: half a EB = pile of iphone with 32G of 283 x height of Empire State building

Seconds: all tweets per year amount to 18.5 TB of text = would take 1200 years to print.

UNECE, 2016
How can we deal with the risks and challenges of sensed data for planning and designing responsive landscapes?

Sayer et al. (PNAS), 2013

1. Securing space for development
2. Cross-scale planning
3. Iterative interdisciplinary process
4. Participative process
5. Access to and usability of the data
6. User-friendly information and communication tools
1\textsuperscript{st} condition

Securing space for development
1. Securing space for development

Tipping points

- Fragmentation Index
- ESC-values based on fragmentation approach
- Fragmentation index

USD/ha/y

2000
2010
business as usual 2030
liberalization 2030

Grêt-Regamey et al. (LUP), 2013

Procedural modelling

Attributes & Objects
Spatial arrangement
Composition

Grêt-Regamey et al. (LUP), 2013
1. Securing space for development

**Tipping points**

- **Fragmentation Index**
  - ESC-values based on fragmentation approach
  - Fragmentation index

- **USD/ha/y**
  - 2000: 650
  - 2010: 700
  - Business as usual 2030: 750
  - Liberalization 2030: 800

**Procedural modelling**

- **Attributes & Objects**
  - `attr treedist = rand (6, 10)`
  - `soil = "WCCFFSR5"`
  - `[more attributes...]`
  - `# Phoenix Dactylyfera (Date palm)`
  - `# adopted to the region; # height: 30m-35m, crow`?
  - `phoenix = "phoenix.obj"`
  - `phoenix_height = rand(20, 30)`
  - `phoenix_width = rand(6, 12) # crown #`?
  - `phoenix_water = 180`
  - `phoenix_crown = phoenix_width * phoe`?
  - `[moreObjects...]`

- **Spatial arrangement**
  - `Lot`?
  - `alignScopeToAxes()`
  - `split (2) {dist : garden(e ~0.5 : part) dist : garde`?

- **Composition**
  - `Tree(tr) --> 30%: other tree --> Pinus Pinar`?
  - `30%: rand(phoenix_height/10, 0: tree`?
1. Securing space for development

Tipping points

- ESC-values based on fragmentation approach
- Fragmentation index

Fragmentation Index

USD/ha/y

-500 0 500 1000 1500

2000 2010

business as usual 2030

liberalization 2030

Procedural modelling

Attributes & Objects

Spatial arrangement

Composition

Adrienne Grét-Regamey  14.06.2017  7
McGarigal (2001): «Grain and extent are dictated by the scale of imagery»

2\textsuperscript{nd} condition

Cross-scale planning
Zoning (peri-urban area Zürich) – NOW

Wissen et al. (LUP), 2015
Zoning (peri-urban area Zürich) – smart city

- Agriculture
- Residential zone <= 2 storey
- Residential zone >= 2 storey
- Residential and commercial zone
- Central zone
- Industry/business with services
- Recreational, open, and green spaces
Degree of recreation – NOW
Degree of recreation – smart city
Targeted urban planning – NOW
Targeted urban planning – smart city
Targeted urban planning – smart city
A tiered approach


Rabe et al. (LUP), 2016
A pattern language (Ch. Alexandre)

Patch-Corridor matrix (Forman)

3rd condition
Iterative interdisciplinary process
Iterative interdisciplinary...

Grêt-Regamey et al., SCS, 2016
....and transdisciplinary approach

Vollmer and Grêt-Regamey, 2015
4th condition
Participative process
Collaborative platforms
Collaborative platforms
Collaborative platforms
5th condition
Access to and usability of data
5. Access to and usability of data

«Sensed data should be understood as the constructed product of a datized moment»

Challenges....

- Social privilege in the collection, dissemination and operational use of data
- Data collected with no specific questions (data reflective of technology)

Ways to go...

- Understanding data in the context of an information system – no tendency measures, but diversity
- Acknowledging assumptions from the process of reasoning from data collection to action.
6th condition
User-friendly information and communication tools
6. User-friendly information and communication tools

Challenges....

- Visual noise: Users cannot divide the objects on the screen
- Information loss: Reduction of visible data sets leads to information loss.
- Large image perception: Data visualization methods are not only limited by aspect ratio and resolution of device, but also by physical perception limits.
- High rate of image change: Users observe data and cannot react to the number of data change or its intensity on display.
- High performance requirements: It can be hardly noticed in static visualization because of lower visualization speed requirements--high performance requirement.
6. User-friendly information and communication tools

For communicating landscape services

- 3D landscapes = analytic functions
- Text and abstract = content and support of discussion
- Thematic 2D maps = support of scenario development and assessments in public setting
- Charts and tables in combination with thematic 2D maps = analysis

Klein et al. (ES), 2016
6. User-friendly information and communication tools

For communicating landscape services

- 3D landscapes = analytic functions
- Text and abstract = content and support of discussion
- Thematic 2D maps = support of scenario development and assessments in public setting
- Charts and tables in combination with thematic 2D maps = analysis
6. User-friendly information and communication tools

For communicating landscape services

- 3D landscapes = analytic functions
- Text and abstract = content and support of discussion
- Thematic 2D maps = support of scenario development and assessments in public setting
- Charts and tables in combination with thematic 2D maps = analysis
Conclusions

Although no panacea, the **6 conditions** will help develop effective workflows for responsive landscape planning approaches to...

- Foster novel ways of deliberative decision-making and governance
- Support humans to intentionally transform landscapes