



Seminar notes from

Social-ecological urbanism

Perspectives on urban resilience and sustainable development

8-9 november 2016
University of Gävle

Organisers:

Stephan Barthel
University of Gävle and Stockholm Resilience Centre

stephan.barthel@hig.se

Karl Samuelsson
University of Gävle

karl.samuelsson@hig.se

Invited speakers:

Erik Andersson
Stockholm Resilience Centre

Sara Borgström
Stockholm Resilience Centre

Anders Brandt
University of Gävle

Johan Colding
Stockholm Resilience Centre and Beijer Institute of Ecological Economics

Ola Eriksson
University of Gävle

Matteo Giusti
Stockholm Resilience Centre

Christian Isendahl
Göteborg University

Marketta Kyttä
Aalto University

Ann Legeby
Royal Institute of Technology

Lars Marcus
Chalmers University of Technology

Christopher Raymond
Swedish University of Agriculture

Patrik Sörqvist
University of Gävle

Marita Wallhagen
University of Gävle

Outlining social-ecological urbanism

Between 2014 and 2050, the world's urban population is projected to increase with 2.5 billion people (United Nations 2014), entailing the construction of vast new urban landscapes. Until 2030, global urban areas will expand by 1.2 million km² (Seto et al. 2012), an area equivalent to the country of South Africa. These new urban areas need to be environmentally sustainable in that they need to mitigate the strain they put on the biosphere and avoid isolating urban inhabitants from natural environments. They also need to be socially sustainable by promoting well-being and addressing issues of segregation.

Advances in urban sustainability are made within different discourses. The currently dominating discourse is the socio-technological one, wherein sustainability is often addressed through efficiency gains in transportation and waste recycling and compact urban development that increase inhabitants' accessibility to urban services. In contrast, the social-ecological discourse has put greater emphasis on urban inhabitants' interaction with urban nature environments for the generation of ecosystem services, for health benefits (mental, physical and social) and for environmental learning and pro-environmental behaviour.

In social-ecological urbanism, the city is considered a complex adaptive system for which it is crucial to build resilience (Andersson et al. 2014). In order to tackle this, social-ecological urbanism draws on several research fields; 1) urban studies for incorporating a systems perspective of the built environment and city life, 2) social-ecological systems research for incorporating a systems perspective of urban nature environments and an understanding of the role of management and governance for promoting their resilience and 3) environmental psychology for incorporating an understanding of the relationship between human cognition and the environment.



Figure 1. The world's urban population is projected to increase with 2.5 billion people until 2050 (United Nations 2014). Photo shows Tokyo, Japan.

A resilience perspective on urban environments

Jane Jacobs (1961) described cities as systems of organised complexity as the variables describing them are interdependent, akin to ecological systems. In his talk, Lars Marcus (Chalmers University of Technology) expanded upon this idea, stating that the spatial structure of cities itself and its relation to other urban systems, whether they be social, economic, ecological or technological, are interdependent. Hence, studying the built environment from a systems perspective entails studying relations between elements of a city's spatial structure, and not only the elements themselves. Variables related to systems properties, such as elements' spatial integration, density and diversity, can be linked to attributes of resilience, such as disturbance, redundancy, self-organisation and knowledge. Through these kinds of analyses, there is potential to gain an understanding of what constitutes a resilient urban form.

Urban social-ecological systems include not only the built environment, but are mosaics of many different land uses, all of them with their green and built up elements. Erik Andersson (Stockholm University) pointed out that this variation makes spatial analyses critically important for understanding their function and resilience. Two complementary approaches are networks and patchworks. Networks can help us understand e.g. vulnerabilities to shock and ability to recover or information flows, whereas the patchwork approach is better suited to answer questions about cross-boundary dynamics or supply and demand of ecosystem services. Both approaches emphasise that relations between elements are as important to understand as the elements themselves.

Urban resilience can be enhanced by integrating socio-technological and social-ecological systems in cities. Ola Eriksson (University of Gävle) contributed with the case of district heat-

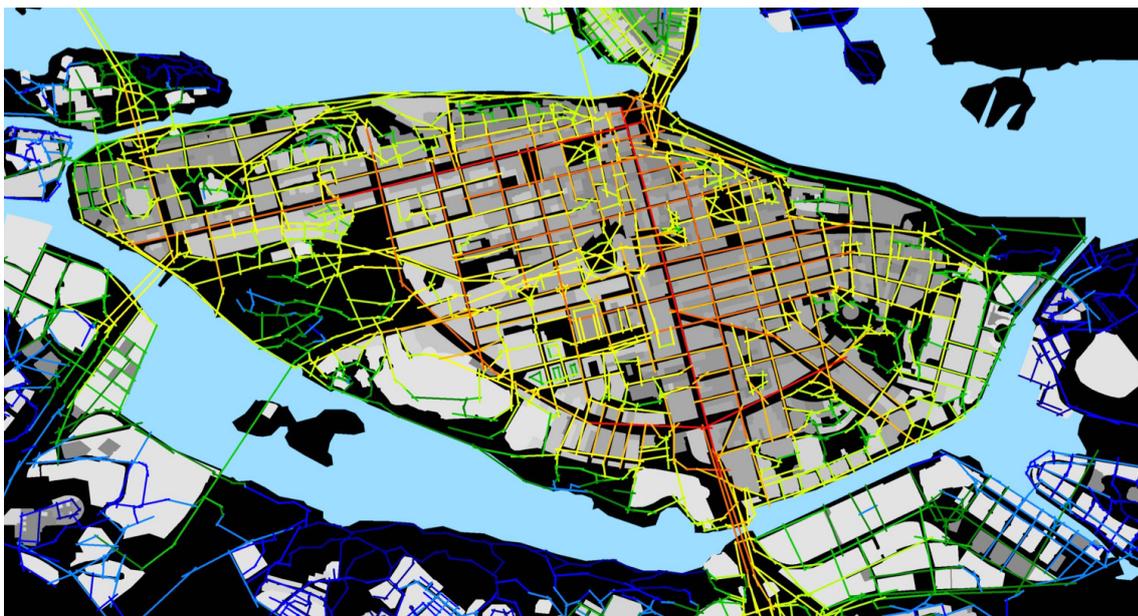


Figure 2. Studying the built environment from a systems perspective entails studying relations between elements of a city's spatial structure, and not only the elements themselves. The spatial integration of streets and parcels on Södermalm is shown above., Stockholm. Figure: Lars Marcus, Chalmers University of Technology.

ing. District heating in Sweden today is almost solely based on non-fossil fuel sources, and as old buildings are renovated and new energy efficient buildings are added to the housing pool, the need for domestic and office heating will eventually drop. This gives the possibility to, rather than spending great effort shrinking the system, reap benefits with other uses. For example, greenhouses could be heated, increasing the capacity to grow food close to cities. Another potential, although less investigated, area revolves around winter heating of public spaces, such as pedestrian streets and bicycle lanes. This could provide several benefits; less accidents, more people choosing to walk or bike rather than taking the car or putting strain on public transport systems and reduced costs of snow clearing.

An inevitable part of addressing resilience in cities is preparing for disturbances, which was the topic of Anders Brandt's (University of Gävle) talk. This requires scientists and planners to communicate and recognise the risk of disturbances. One of the best communication tools for urban planning are maps, highlighting the need for high quality spatial data. Flood risk maps are an apparent case where higher resolution of data enables vastly more informed decisions. On the other hand, uncertainty is inherent in all maps, and recognition of this uncertainty can enable even more informed decision making. In addition, through an approach embracing this uncertainty, it is possible to find synergistic effects, such as areas designated as flood buffer zones providing benefits in the form of ecosystem services.

Christian Isendahl (Göteborg University) talked about how historical ecology offers a long-term temporal perspective on resilience of social-ecological systems, complementing the spatial approaches outlined above. It provides case studies in different spatio-temporal contexts, i.e. history as either difference or analogy, as well as a temporal analytical perspective on social or environmental change that enables understanding of long-term building or erosion of resilience, i.e. history as process. Ultimately, it can serve as a means of re-imagining current cities as alternative social-ecological system in states more resilient in the long term (Barthel and Isendahl 2013).

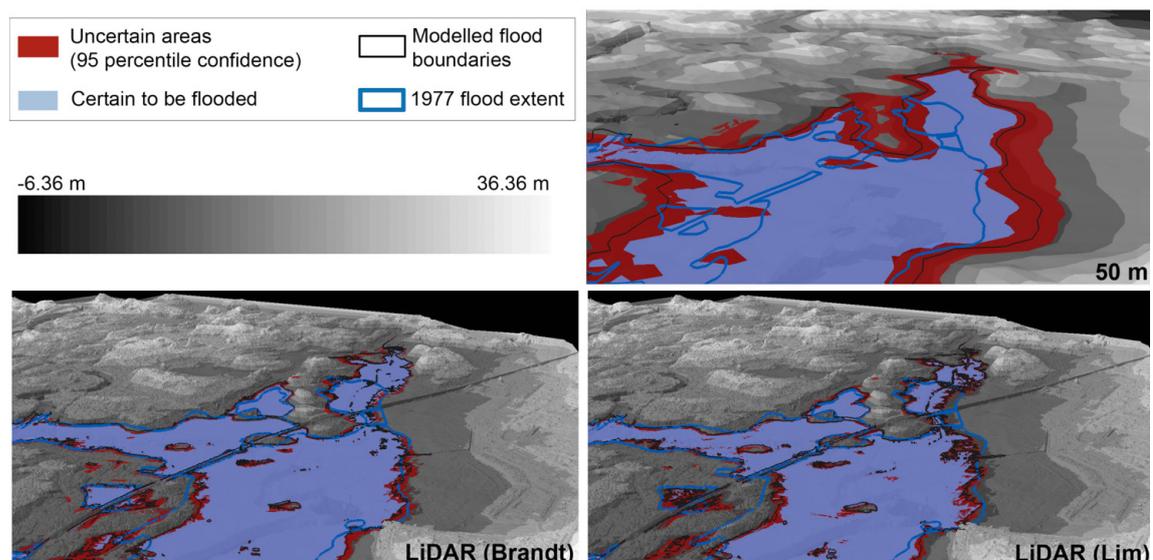


Figure 3. High quality spatial data is crucial for making informed planning decisions. However, uncertainty is inherent in all maps, and recognition of this uncertainty can enable even more informed decision making. Figure from Brandt and Lim (2016).

Context-sensitive approaches for social sustainability

As many cities are continually growing, focus in the planning debate is often heavily weighted towards housing, in favour of public spaces and services. Ann Legeby (Royal Institute of Technology) talked about the need to see the opportunities that urbanisation offers for not only providing more housing units, but also address issues of segregation and equal opportunities. Here, the concept of affordances, relations between people and their environment that enable or hinder functional and social actions or emotions (Heft 2001), is helpful for understanding the link between urban form and social co-presence. Investigating local-scale affordances are important for understanding equality of opportunities for different neighbourhoods, but perhaps more importantly, a systems approach to large-scale urban form is important for understanding segregation between neighbourhoods and the potential for co-presence of different inhabitant groups.

The affordance concept can be operationalised through space syntax methods, whereby urban form is represented by a network of lines and the integration of spaces within the network is measured. For example, squares in Stockholm with higher spatial integration tend to have a higher degree of visitors from outside the local neighbourhood (Legeby 2013). The concept can also be operationalised through public participatory GIS (PPGIS), whereby urban inhabitants are asked through surveys to map relations they have with places in their city. For example, Karl Samuelsson (University of Gävle) showed that neighbourhoods in Stockholm that have a high concentration of workplaces are more negatively experienced than other neighbourhoods.



Figure 4. Affordances are relations between people and their environment that enable or hinder actions or emotions (Heft, 2001). The depend both on what resources and services are available and the structure of urban form. Photo: Ann Legeby, Royal Institute of Technology.

This approach also enables linking experiences and well-being to different urban contexts. Marketta Kyttä (Aalto University, Helsinki) highlighted that social sustainability is not achieved by applying the same treatment across all urban contexts. For example, in Helsinki the quality of densely built environments and service access is perceived differently in urban and suburban contexts (Kyttä et al. 2016). Such knowledge can be immensely useful as a planning tool that is both context-sensitive and legitimate. In addition, it allows for proactive participatory approaches to planning, as opposed to commonplace procedures where the public is invited to react to plans.

Re-connecting people in cities with the biosphere

Patrik Sörqvist (University of Gävle) talked about the major challenges in environmental psychology. Environmental psychology studies the psychological processes engaged in encounters between people and natural or built environments, thus being an essential research field for understanding what kind of urban development promotes well-being among citizens. Environmental psychology concerned with sustainable behaviour has largely built on a social psychological tradition, with emphasis on how personality traits and attitudes shape behaviour, whereas the ecological approach, focusing on how the environment shapes behaviour, has largely been forgotten. Nevertheless, this latter approach holds great potential for identifying environmental features that support sustainable behaviour (Sörqvist 2016).

Christopher Raymond (Swedish University of Agricultural Sciences) talked about two kinds of human cognition related to the environment. The environment influences people in very straight-forward ways when meaning is directly perceived. E.g. wide and visually striking bicycle lanes might encourage biking through perceived security. This kind of cognition is in line with the affordance concept. On the other hand, the relationship might be influenced

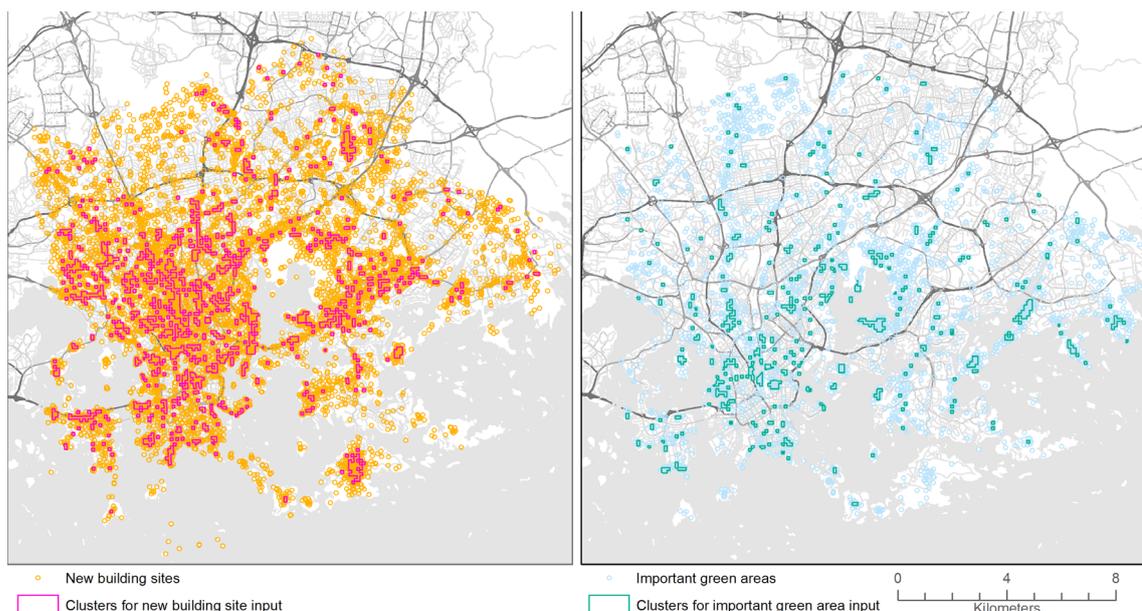


Figure 5. PPGIS is a method for mapping inhabitants' affordances of their living environments, providing opportunities to include a wealth of local knowledge in urban planning. Here, the new city plan of Helsinki is shown. Figure from Kahila-Tani et al. (2015)

by social and community aspects, in addition to ecological ones, and evolve over time into a 'sense of place'. Here, direct perception is complemented by social or communal factors to construct meaning. Crucially, in both conceptualisations, the environment is considered an integral part of perception. This conceptual division opens up new directions for research where the systemic dynamics of human-environment relations need to be better understood.

Current urban planning, rather than being concerned with human-environment relations, departs from a set of demands that are fulfilled by corresponding functions. Matteo Giusti (Stockholm University), however, pointed out that this process contains an assumption of human-made and natural environments as separated, which influences the kinds of experiences urban inhabitants have on an everyday basis (Marcus et al. 2016). This is especially important concerning children that grow up in urban environments, as people's attitudes towards nature are largely formed at a young age. The concept of nature routines, meaning the reoccurring experiences of nature in the everyday environment, has been applied to show that in Stockholm, preschool children with rich nature routines have a stronger cognitive connection with nature than children with poor nature routines (Giusti et al. 2014).

Management and transitions toward sustainability

Marita Wallhagen's (University of Gävle) talk was about how planners and developers increasingly use environmental assessment tools as a means of moving urban planning and design towards sustainability. Considering the complexity of urban sustainability, this, however, raises questions about what aspects of sustainability are considered for these tools and how they are measured and weighted. The two most common assessment tools for neighbourhood sustainability vary considerably in their weighting, as one put emphasis on environmental factors and the other on socio-economic factors. Clearly, no one assessment tool captures urban sustainability completely. They can, however, provide thorough assessments that,



Figure 6. Nature routines are the reoccurring experiences of nature in the everyday environment. These are thought to be of importance for the development of a cognitive connection with nature among urban inhabitants. The photo shows the Southern Ridges park in Singapore.



as long as it is acknowledged that they are informed by values regarding measuring and weighting, can be an asset for urban planning.

Johan Colding (Stockholm University, Beijer Institute of Ecological Economics) talked about the concept of commons, i.e. resources that are collectively owned and managed by a local community together with the rules and regulations surrounding them. This concept has been extensively developed in natural resource management research. Recently, it has been applied to urban environments as urban green commons (Colding and Barthel 2013). Such areas include allotments, urban gardening projects and user contracts where participants has the mandate to manage the area and design rules and regulations to sustain the resource. Potentially, they provide several advantages over e.g. urban parks. Firstly, they can lower management costs. Secondly, they can promote participatory planning that involves residents, as direct involvement in an area generally entails a greater interest in the future planning of that area. Lastly, as people engage directly with natural environments, they promote social learning and a cognitive connection with nature that shape values towards the biosphere.

Urban green commons are among the many local sustainability initiatives that have been formed over the last years in cities. Sara Borgström (Stockholm University) argued that researchers have the potential to co-create knowledge together with such initiatives, in order to understand how a transition to urban sustainability can be accelerated. Today, many local initiatives risk being stuck in a “projectification trap” that isolates them from larger sustainability networks and hinders their long-term development. They have a lot of freedom to pursue specific activities but few resources to continually sustain them. On the other hand, local authorities, that do have financial and organisational resources, instead have a narrow mandate with few policies to support initiatives. New roles and competences are needed solely to bridge governance levels and connect initiatives, i.e. essentially form a resilient



Figure 7. Urban green commons are green spaces in urban settings of diverse land ownership that depend on collective organisation and management (Colding and Barthel 2013). They can potentially results in lower management costs, promote participatory planning and a cognitive connection with nature among the people involved. Photo: Johan Colding, Stockholm University.



References

- Andersson, E., S. Barthel, S. Borgström, J. Colding, T. Elmqvist, C. Folke, and Å. Gren. 2014. Reconnecting cities to the biosphere: stewardship of green infrastructure and urban ecosystem services. *Ambio* 43: 445–53. doi:10.1007/s13280-014-0506-y.
- Barthel, S., and C. Isendahl. 2013. Urban gardens, agriculture, and water management: Sources of resilience for long-term food security in cities. *Ecological Economics* 86. Elsevier B.V.: 224–234. doi:10.1016/j.ecolecon.2012.06.018.
- Brandt, S. A., and N. J. Lim. 2016. Visualising DEM-related flood-map uncertainties using a disparity-distance equation algorithm. *Proceedings of the International Association of Hydrological Sciences* 373: 153–159. doi:10.5194/pi-ahs-373-153-2016.
- Colding, J., and S. Barthel. 2013. The potential of “Urban Green Commons” in the resilience building of cities. *Ecological Economics* 86. Elsevier B.V.: 156–166. doi:10.1016/j.ecolecon.2012.10.016.
- Giusti, M., S. Barthel, and L. Marcus. 2014. Nature Routines and Affinity with the Biosphere : A Case Study of Preschool Children in Stockholm. *Children, Youth and Environments* 24: 16–42.
- Heft, H. 2001. *Ecological psychology in context: James Gibson, Roger Barker, and the legacy of William James’s radical empiricism*. Mahwah: Lawrence Erlbaum Associates, Publishers.
- Jacobs, J. 1961. *The Death and Life of Great American Cities*. New York: Random House. doi:10.2307/794509.
- Kahila-Tani, M., A. Broberg, M. Kyttä, and T. Tyger. 2015. Let the Citizens Map—Public Participation GIS as a Planning Support System in the Helsinki Master Plan Process. *Planning Practice & Research* 7459. Routledge: 1–20. doi:10.1080/02697459.2015.1104203.
- Kytta, M., A. Broberg, M. Haybatollahi, and K. Schmidt-Thome. 2016. Urban happiness: context-sensitive study of the social sustainability of urban settings. *Environment and Planning B: Planning and Design* 43: 34–57. doi:10.1177/0265813515600121.
- Legeby, A. 2013. *Patterns of co-presence: Spatial configuration and social segregation*. Royal Institute of Technology.
- Marcus, L., M. Giusti, and S. Barthel. 2016. Cognitive affordances in sustainable urbanism : contributions of space syntax and spatial cognition. *Journal of Urban Design* 4809. doi:10.1080/13574809.2016.1184565.
- Seto, K. C., B. Güneralp, and L. R. Hutyrá. 2012. Global forecasts of urban expansion to 2030 and direct impacts on biodiversity and carbon pools. *Proceedings of the National Academy of Sciences of the United States of America* 109: 16083–16088. doi:10.1073/pnas.1211658109.
- Sörqvist, P. 2016. Grand Challenges in Environmental Psychology. *Frontiers in Psychology* 7. doi:10.3389/fpsyg.2016.00583.
- United Nations. 2014. *World Urbanization Prospects: The 2014 Revision, Highlights (ST/ESA/SER.A/352)*. doi:10.4054/DemRes.2005.12.9.