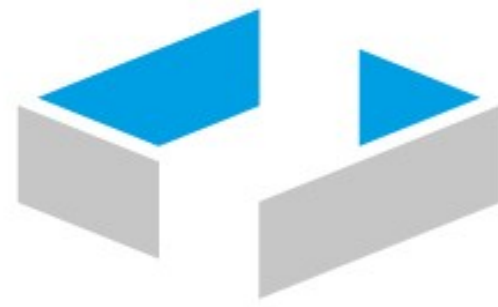


Potentials of urban agriculture

The importance of productive area in the urban green space of Osnabrück for a climate-resilient city



HOCHSCHULE OSNABRÜCK
UNIVERSITY OF APPLIED SCIENCES

Torsten Schulz*, Joy Ruschkowski, Hubertus von Dressler, Andreas Ulbrich

*Corresponding author: Hochschule Osnabrück, Faculty for Agriculture and Landscape Architecture; t.schulz.2@hs-osnabrueck.de

1. Motivation

By 2030 60% of the world’s population live in cities (Fuller and Gaston 2009). In view of the climate change the instalment of green cities is becoming increasingly important. Additionally, the School of Urban Sociology (Chicago School) described urban areas as being distinctly different from rural areas, becoming separate entities essentially detached from their broader life-support system (Wirth 1938). In Osnabrück the existing (radial) structure of urban green space is called “Grüne Finger” and are nearly half agricultural used land. The project “Productive. Sustainable. Vivid. Grüne Finger for a climate-resilient city” sees the preservation of the “Grüne Finger” as an important purpose for the city’s future. The agriculture as part of this structure contributes to the tasks of climate change mitigation and climate change adaptation. The goal is to adjust relevant parameters for these tasks and thus increase the resilience of agricultural land and the city.

2. Methods

- Literature review on resilience parameters for climate and long term food security
- Participative approaches with local farms
- Data query with the farmers
- Field trials in pilot operation (evaluation of parameters for plants)
- Field trials on cooperation farms (as part of participative processes)

3. Functions of agricultural area in Osnabrück

Cold air production and supply

- The Grüne Finger transport fresh air towards the city center through various effective air stream channels (Geo-Net Umweltconsulting GmbH 2017) [Fig. 1]
- A source of cooling during warm weather periods is transpiration from plants
- Due to the relatively high intermolecular force of water a correspondingly large latent heat of vaporization is consumed (Katul et al. 2012)

Water retention

- Green areas around Osnabrück’s rivers and streams serve as a natural retention basin against flooding, which may occur after heavy rains
- Depending on the groundwater level and soil type (agricultural) soils store and release water delayed

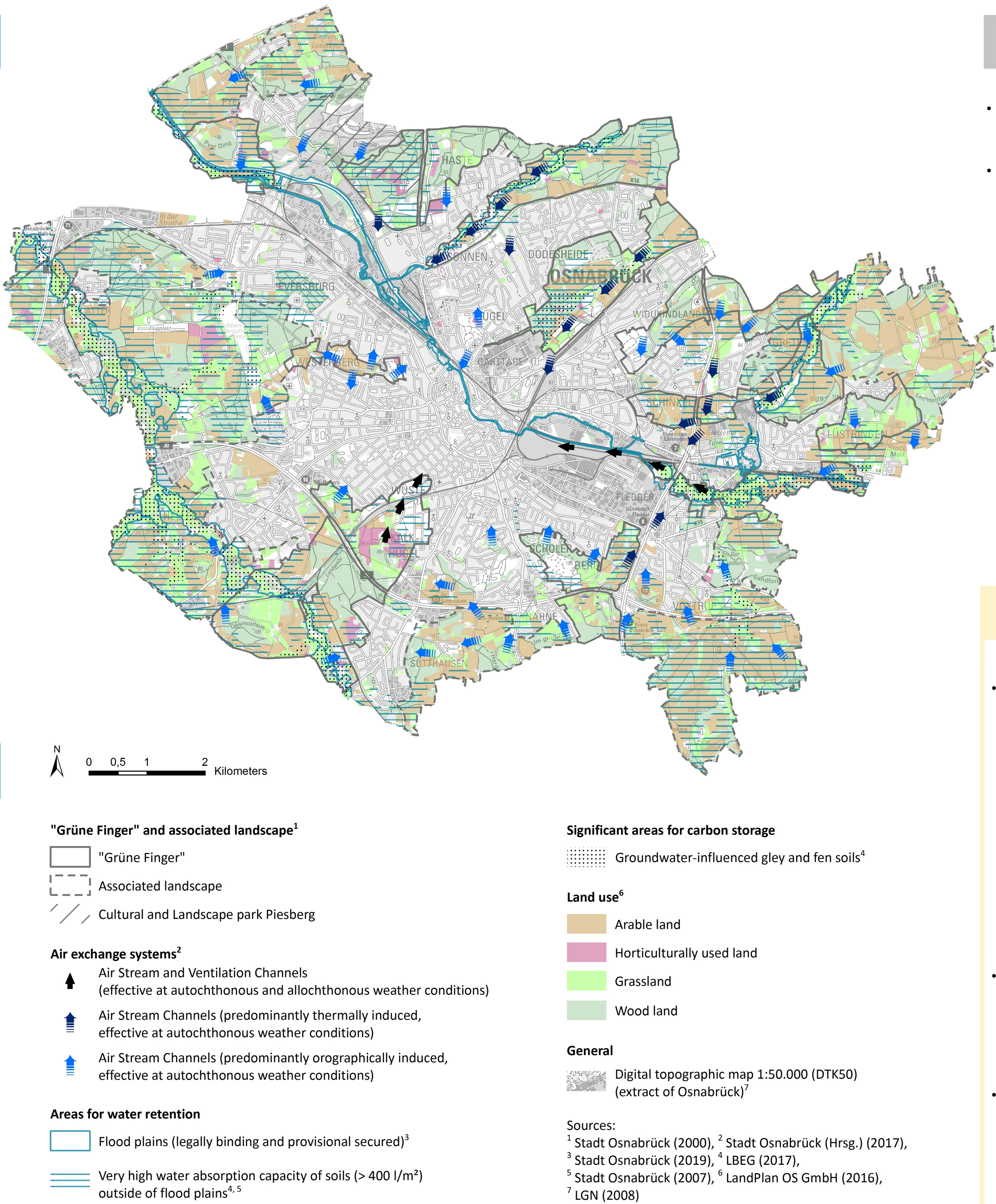


Fig. 1: Contribution of agricultural area to Osnabrück’s climate-resilience

Carbon sink

- Grassland can serve as carbon storage
- Local products indirectly reduce carbon emissions of food transport to the city - food travels on average 1,300 miles from farm to table (Ackerman et al. 2014)

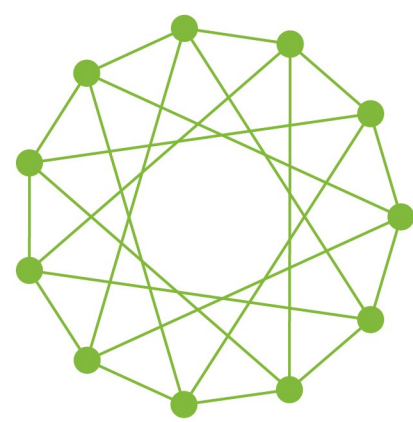
Social functions

- Urban agriculture has the potential to reconnect urban people to its life-support system (Community gardens as “memory workers”)(Barthel and Isendahl 2012)
- Increase of consumer-producer relations
- Urban green commons actively involve local actors in rebuilding urban nature

4. Outlook

Field trials in the forthcoming growing period in pilot operation and on co-operation farms will check defined assessment standards regarding recommendations for crops from an ecological, economical, and climate perspective. Therefore a climate-plant-model needs to be defined in advance, and will include (temporarily) carbon storage, water consumption

and storage, and transpiration characteristics, among others. Growing trials under greenhouse conditions in the upcoming winter will previously determine these parameters in different growing stages. Additionally, it will be determined whether the valorisation of ecosystem services (non-use values) of uneconomical farms is possible, and to what extent.



Urbane
AgriKultur
Zukunft Lebensraum Stadt



DIE | FRIEDENSTADT



Sources:
Ackerman, K.; Conrad, M.; Culligan, P.; Plunz, R.; Sutto, M.-P.; Whittinghill, L. (2014): 'Sustainable Food Systems for Future Cities: The Potential of Urban Agriculture.' Economic and Social Review 45 (2):189-206
Barthel, S.; Isendahl, C. (2012): 'Urban gardens, agriculture, and water management: Sources of resilience for long-term food security in cities.' Ecological Economics 86 (2013): 224-234
Fuller, R.A.; Gaston, K.J. (2009): 'The scaling of green space coverage in European cities.' Biol Lett 5(3):352-355
Geo-Net Umweltconsulting GmbH (2017): 'Konzept zur Anpassung an die Folgen des Klimawandels der Stadt Osnabrück' Osnabrück, 2017
Katul, G.G.; Oren, R.; Manzoni, S.; Higgins, C. (2012): 'Evapotranspiration: A process driving mass transport and energy exchange in the soil-plant-atmosphere-climate system.' Rev. Geophys. 50: RG3002
Wirth, L. (1938): 'Urbanism as a way of life.' The American Journal of Sociology 44 (1938), 1-24