



greencare

Wo Menschen aufblühen

Proceedings

of the

**3rd International Conference on Landscape and
Human Health: Forests, Parks and Green Care**

May 17 - 19, 2017, Diplomatic Academy of Vienna, Austria

www.landscapeandhealth.at



ISBN 978-3-902762-79-5

Imprint

© May 2017

Reproduction of this document is subject to the permission of the editor.

Responsible for the Contents

DI Dr. Peter Mayer

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape

Seckendorff-Gudent-Weg 8

1131 Vienna, Austria

Tel.: +43-1-878 38-0

<http://bfw.ac.at>

The publications published in the proceedings of the 3rd International Conference on Landscape and Human Health: Forests, Parks and Green Care are the property of their respective authors. The Federal Research Centre for Forests and the Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences, Vienna, are publishers of the proceedings. The authorship of the individual articles lies with the respective authors. In the case of citation in scientific papers, the usual formal requirements for reference citation must be complied with.

Layout

Johanna Kohl

Photo

Filmstill aus „See Aural Woods“ (Luma.Launisch & Takamovsky)

Printing

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Vienna, Austria

Order and Contact

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape,
Library

Tel.: +43-1-878 38-1216

E-Mail: bibliothek@bfw.gv.at

Online-Order: <http://bfw.ac.at/webshop>

Citation

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape & Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences, Vienna (eds) (2017). Proceedings of the 3rd International Conference on Landscape and Human Health: Forests, Parks and Green Care. BFW, Vienna.



Organizing Committee

Katharina Bancalari, Austrian Research Centre for Forests
 Franziska Hütter, Austrian Research Centre for Forests
 Christian Lackner, Austrian Research Centre for Forests
 Petra Isabella Schwarz, Austrian Research Centre for Forests
 Sylvia Stadler, Austrian Research Centre for Forests
 Arne Arnberger, BOKU – University of Natural Resources and Life Sciences, Vienna
 Renate Eder, BOKU – University of Natural Resources and Life Sciences, Vienna
 Brigitte Alex, BOKU – University of Natural Resources and Life Sciences, Vienna
 Birgit Steininger, University College for Agrarian and Environmental Pedagogy
 Georg Wiesinger, Federal Institute for Mountainous and Less-Favoured Areas
 Nicole Prop, Green Care Austria
 Sylvia Zach, Green Care Austria
 Leopold Ziehaus, Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management

Steering Committee

Nicole Bauer, Institute for Forest, Snow & Landscape Research (WSL), Switzerland
 Matilda van den Bosch, Swedish University of Agricultural Sciences, Sweden
 Giuseppe Carrus, University of Roma Tre, Italy
 Renate Cervinka, University College for Agrarian and Environmental Pedagogy, Austria
 Thomas Claßen, Landeszentrum Gesundheit Nordrhein-Westfalen, Germany
 Marjolein Elings, Wageningen University & Research centre (UR), Netherlands
 Erwin Frohmann, University of Natural Resources and Life Sciences Vienna (BOKU), Austria
 Ralph Hansmann, ETH-Zurich, Switzerland
 Terry Hartig, Uppsala University, Sweden
 Hans-Peter Hutter, Medical University of Vienna, Austria
 Elisabeth Johann, Association "Forest Pedagogic in Austria", Austria
 Anna Jorgensen, University of Sheffield, United Kingdom
 Thomas Kistemann, University of Bonn, Germany
 Kalevi Korpela, University of Tampere, Finland
 Raimund Rodewald, Swiss Foundation for Landscape Conservation, Switzerland
 Jenny Roe, University of Virginia, USA
 Candice Shoemaker, Kansas State University Manhattan, United Kingdom
 Dominik Siegrist, Hochschule für Technik Rapperswil (HSR), Switzerland
 Tuija Sievänen, Natural Resources Institute Finland (Luke), Finland
 Liisa Tyrväinen, Natural Resources Institute (Luke), Finland
 Ulrika Stigsdotter, University of Copenhagen, Denmark
 Sjerp De Vries, Alterra, Netherlands
 Hans Wydler, ZHAW Life Sciences und Facility Management, Switzerland



Preface

The Austrian Research Centre for Forests (BFW) addresses all forest-related aspects. In 2014 BFW initiated the project "Green Care FOREST", which focuses on the social value of forests. Green Care FOREST is based on the study "Green Public Health". The results indicate that staying in a forest environment contributes to general well-being, protects against stress related diseases and supports mental health.

Based on these findings, the **3rd International Conference on Landscape and Human Health** is part of the project Green Care FOREST and is organised by the BFW, together with the University of Natural Resources and Life Sciences (BOKU Vienna).

Our everyday fast-paced life, the growing disconnectedness from nature and decreasing possibilities to enjoy natural environments are the basis for discussion at the conference.

The increase of nervousness, stress and burn-out as well as associated physical side effects in western societies are serious issues of our time. Nevertheless, the solution to these health problems might be just at our doorstep: in the natural and cultural landscapes surrounding us. They are perceived as recreative settings, counteracting the symptoms mentioned above.

We are looking forward to welcome researchers, public authorities, public health administrations as well as people involved and interested in landscape-based health offers to Vienna. We aim to connect scientific research with hands-on Green Care praxis and look forward to an international transfer of knowledge and experience. The conference is a place where current developments and scientific results can be displayed and shared. It will encourage conversations and networking as well as inspire new project ideas and point out need for actions.

Presentations will focus on natural- and cultural landscapes such as forests, gardens or blue spaces. They will deal with different target groups, such as children and adolescents, people with special needs or seniors. They will give practical insights in Green Care projects and offer an outlook on future fields of action in policy and planning.

Furthermore, the supporting program of the Conference and the conference city Vienna itself offer interesting insights into local natural and cultural landscapes: Despite being the largest city and capital of Austria, more than fifty percent of Vienna is made up of green spaces. Practical approaches during the excursions as well as the garden party during the Icebreaker at the BFW display only some of Austria's rich natural and cultural landscapes.

I would like to close with a simple fact: Human health is not only an important socio-political topic of today and the future. Our personal wellbeing defines our life and is often only then recognised when imbalanced. Nature itself, as our basis of life, has a significant influence on our health and wellbeing – and must not be forgotten or overlooked. Therefore, a responsible and sustainable treatment of nature is crucial and the best health insurance we could ask for!

I wish you a fruitful and inspiring conference!

Peter Mayer
Managing Director of the Austrian Research Centre for Forests



Contents

Organizing Committee	3
Steering Committee	3
Preface	5
Useful information	9
1. Official language	9
2. Important Venues	9
3. Registration desk	12
4. Fees and Banks	12
5. Lunch and Dinner	13
6. Public transport to Vienna	15
9. Useful maps	16
10. Contact to Organisers	16
Icebreaker	17
Excursion I and II, Friday, 19 th May 2017	19
Excursion I (West of Vienna)	19
Excursion II (Northwest of Vienna)	19
Sessions	21
Program Overview	22
Parallel Sessions – Thursday, 18 th May 2017	24
Parallel Sessions – Friday, 19 th May 2017	29
Oral Presentations	33
Contents	35
Poster Presentations	105
Contents	107
List of Participants	137



Useful information

1. Official language

The official conference language is English.

2. Important Venues

Icebreaker (17th May 2017)

The Icebreaker is a garden party and takes place at the Austrian Research Centre for Forests (Bundesforschungszentrum für Wald, BFW).

For further information on the program of the Icebreaker, see "Icebreaker" below (page 17).

Address

Austrian Research Centre for Forests (Bundesforschungszentrum für Wald, BFW)

Seckendorff-Gudent-Weg 8, 1131 Wien/Vienna

Tel.: 00 43 1 878 38 0

Homepage: www.bfw.ac.at

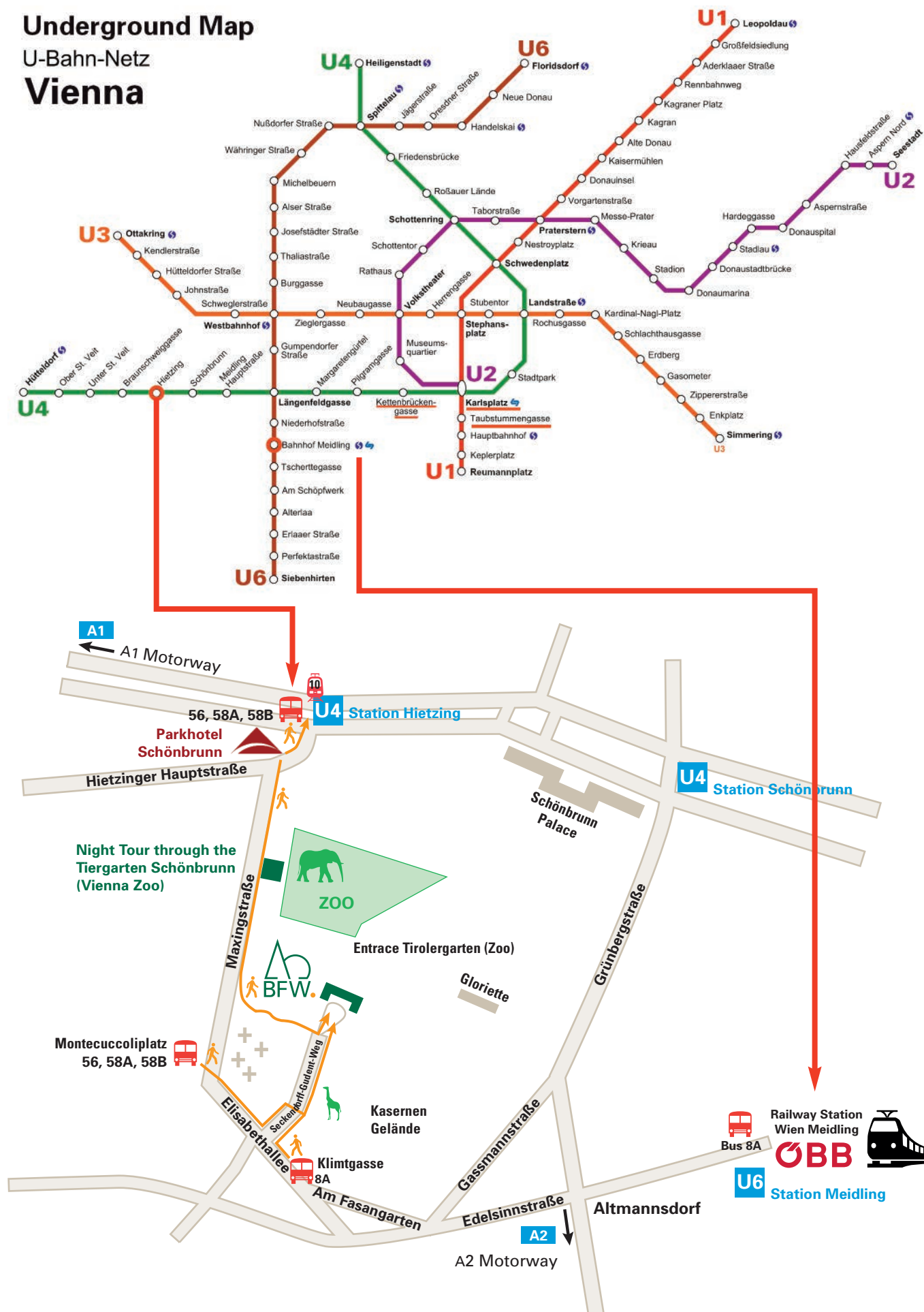
How to get to the Icebreaker at the BFW... (see Map page 10)

- from Parkhotel Schönbrunn by foot
From the Parkhotel Schönbrunn you can walk (approx. 20 min) via "Maxingstraße", see map.
- from Parkhotel Schönbrunn by public transport
From the Parkhotel Schönbrunn you can walk to the station "Hietzing" (approx. 3 min, see map). From "Hietzing" take the bus 56A, 56B or 58A to "Montecuccoliplatz" (approx. 5 min) and then walk via "Elisabethallee" and "Seckendorff-Gudent-Weg" (approx. 10 min), see map below.
- from Hotel Johann Strauss by public transport and by foot
From Hotel Johann Strauss take the U1 from station "Taubstummengasse" (direction "Wien Leopoldau") to station "Karlsplatz", then change to U4 (direction "Hütteldorf") and go to station "Hietzing".

You can walk from "Hietzing" (approx. 20 min) via "Maxingstraße", see map. Or take the bus 56A, 56B or 58A from "Hietzing" to "Montecuccoliplatz" (approx. 5 min) and then walk via "Elisabethallee" and "Seckendorff-Gudent-Weg" (approx. 10 min), see map.



Underground Map U-Bahn-Netz Vienna





Conference (18th – 19th May 2017)

The conference takes place at the Diplomatic Academy of Vienna.

For further information on the conference program, see "Sessions" below.

Address

Diplomatic Academy of Vienna

Favoritenstraße 15a, 1040 Wien/Vienna

Tel.: 00 43 1 505 7272

Homepage: www.da-vienna.ac.at/en/

Email: info@da-vienna.ac.at

Information about the Diplomatic Academy of Vienna

In 1754 the Empress Maria Theresa founded the Oriental Academy to train young men for the diplomatic service of the Habsburg monarchy. Out of the Oriental Academy evolved first the Consular Academy and in 1964 the Diplomatic Academy of Vienna, which in 1996 was granted the status of an independent public training institution. The Academy is thus one of the oldest of its kind worldwide.

How to get to the Diplomatic Academy of Vienna...

- from Parkhotel Schönbrunn by public transport
From station "Hietzing" (direction "Heiligenstadt") take the U4 to station "Karlsplatz", then change to U1 (direction "Reumannplatz") and go to station "Taubstummengasse", which is only 2 walking minutes away from the Diplomatic Academy of Vienna, see map below.
- from Hotel Johann Strauss by foot
The Diplomatic Academy of Vienna is only 3 walking minutes away from Hotel Johann Strauss, see map below.





3. Registration desk

- Opening times

Wednesday, 17th May 2017
07:00 pm until 08:45 pm
During the Icebreaker at the BFW

Thursday, 18th May 2017:
08:00 am until 04:30 pm
Diplomatic Academy of Vienna

Friday, 19th May 2017:
08:00 am until 10:00 am
Diplomatic Academy of Vienna

At the registration desk, we provide with various information on the conference and Vienna:

- Your personal conference schedule (details on your bookings)
- Conference USB stick, including the Conference proceedings
- Trial copies of the Conference proceedings
- Your name tag
- Information material on Vienna
- Maps
- Goodies and apples for a fresh break

4. Fees and Banks

	Early Bird (until 15.03.2017)	Regular Fee 16.03.-15.04.2017	Student (until 15.03.2017)
incl. Dinner	230 €	280 €	220 €
without Dinner	200 €	250 €	190 €

Unfortunately we cannot offer credit card payment. Please pay your conference fee via bank transfer.

Banking details:

Name of Bank: BAWAG P.S.K.
Address: Seitzergasse 2-4, A-1010 Wien, Austria,
Account No.: 96.050.844
Sort Code: 60000
BIC: BAWAATWW
IBAN: AT09 6000 0000 9605 0844
VAT Number: ATU 61289616



5. Lunch and Dinner

Wednesday, 17th May 2017:

Finger food and drinks are provided at the Icebreaker from 07:45 pm.

Thursday, 18th May 2017:

Lunch is provided at the Diplomatic Academy of Vienna between 01:00 pm until 02:20 pm.

The Conference Dinner takes place at the "Heuriger 10er Marie" at 08:00 pm, see address below.

Friday, 19th May 2017:

We will provide lunch packages for the excursions, consisting of a vegetarian and sweet snack and a soft drink. Please pick up your lunch package at the meeting point for the excursions in the Diplomatic Academy.

Information on the Viennese "Heuriger 10er Marie"

Our conference dinner takes place at a very special, comfortable and rustic location in Vienna.

A "Heuriger" (or plural "Heurige") is a typical Viennese wine tavern. The word "Heuriger" is used for the tavern itself, but also refers to the drinks you get there: In a typical Viennese "Heuriger" they only serve Viennese wines from the current vintage. You can also enjoy homemade products, cold or warm small dishes. Viennese live music, so called "Schrammelmusik" played with fiddles, guitars and accordions, is also quite common.

We will visit the "Heuriger 10er Marie" for dinner, which is the oldest Heuriger in Vienna. It was founded in 1740.

Address

Heuriger 10er Marie

Ottakringer Straße 222-224

1160 Wien/Vienna

Tel.: 00 43 1 489 46 47

Homepage: www.fuhrgassl-huber.at/10er-marie/

Email: 10ermarie@fuhrgassl-huber.at



PHOTO: COMMONS.WIKIMEDIA.BWAG



How to get to the Heuriger 10er Marie...

- from Parkhotel Schönbrunn by public transport
From the Parkhotel Schönbrunn you can walk (approx. 3 min) to the station "Hietzing". From there you can take the tram 10 (direction "Dornbach, Güpferlingerst.") to "Thaliastraße/Maroltingergasse" (approx. 18 min) and then walk to the Heuriger 10er Marie (approx. 7 min), see map below.
- from Hotel Johann Strauss by public transport
From Hotel Johann Strauss take the U1, station "Taubstummengasse" (direction "Wien Leopoldau") to station "Karlsplatz". Then walk to "Wien Kärntner Ring/Oper" (approx. 5 min, see map below) and from there take the tram 2 (direction "Ottakringer Str./Erdbrustg.") to station "Johannes-Krawarik-Gasse". From there, it is only 2 walking minutes to the Heuriger 10er Marie.



GOOGLE MAPS





6. Public transport to Vienna

- **Plane**
The Vienna International Airport (in German: Flughafen Wien-Schwechat) is located in Schwechat, 18 km southeast of Vienna.

Address
Wien-Flughafen
1300 Schwechat
Homepage: www.airportvienna.com
- **City Airport Train (CAT)**
The City Airport Train is the most convenient form to go to the city center, station "Wien Mitte" (16 minutes, single ticket 11€, return ticket 17€).
Another possibility is the ÖBB-Train S 7 direction "Wolkersdorf".
Homepage: www.cityairporttrain.com
- **Train**
Come by train with the Austrian Federal Railways (ÖBB). The station "Südtiroler Platz - Hauptbahnhof" (Main Railway Station) is only one underground station away from the Diplomatic Academy of Vienna.
Homepage: www.oebb.at

7. Public Transport in Vienna

The public transport in Vienna is called "Wiener Linien". Tickets can be bought at Wiener Linien's ticket offices, at ticket machines and at tobacconist. You can also buy your 24, 48 or 72 hours Vienna ticket online at the ticket shop (you can find it on Wiener Linien's website via "Tickets" ➔ "Short term tickets").
Homepage: www.wienerlinien.at

8. Where to stay

We have arranged special rates for conference participants in the following two hotels:

- **Austria Trend Parkhotel Schönbrunn**

About Parkhotel Schönbrunn

The hotel is located in walking distance to the Schönbrunn Palace, the underground Line U4 (Station "Hietzing") as well as the BFW (Icebreaker venue).

From the Parkhotel Schönbrunn, the Diplomatic Academy of Vienna is easy to reach by public transport: U4 station "Hietzing" (direction "Heiligenstadt") to station "Karlsplatz", then change to U1 (direction "Reumannplatz") and go to station "Taubstummengasse". It takes about 30 minutes from the hotel to the conference venue.

At the Parkhotel Schönbrunn you can experience Imperial Vienna on a truly personal level: the hotel is located in the carefully restored former guest house of Emperor Franz Joseph I. It was originally a rest stop opened in 1787, and expanded into an inn in 1823.

Rates

Standard single room for EUR 80€, including hot breakfast buffet.

This is a special Conference rate with a limited number of rooms, please book directly via web form www.landscapeandhealth.at/index.php/accomodation.



Address

Hietzinger Hauptstraße 10-14

1130 Wien/Vienna

Tel.: 00 43 1 878 040

Homepage: www.austria-trend.at/de/hotels/parkhotel-schonbrunn

Email: reservierung.parkhotel.schoenbrunn@austria-trend.at

- **Hotel Johann Strauss**

About Hotel Johann Strauss

The hotel Johann Strauss is only 3 walking minutes away from the Diplomatic Academy of Vienna. Sights like Naschmarkt, Karlsplatz and the Belvedere Palace are also within walking distance.

Rates

EUR 147€ per night including hot breakfast buffet

EUR 107€ for single use

Please contact the hotel by mail or phone using the keyword Green Care.

Please use the download reservation form from our website

www.landscapeandhealth.at/index.php/accomodation

Address

Favoritenstrasse 12

1040 Wien/Vienna

Tel.: 00 43 1 505 7624

Homepage: www.kremslehnerhotels.at/de/hotel-johann-strauss-wien/

Email: js@kremslehnerhotels.at

9. Useful maps

- U-Bahn Plan (Underground Map) from Vienna (page 10)

10. Contact to Organisers

Conference office

Katharina Bancalari, Franziska Hütter, Sylvia Stadler

Tel.: 00 43 664 4330686

Homepage: www.landscapeandhealth.at

Email: office@landscapeandhealth.at



GLORIETTE, SCHÖNBRUNN — PHOTO: WIKIMEDIA, THOMAS WOLF



Icebreaker

The Icebreaker will take place on 17th May 2017 at 7:00 pm at the Austrian Research Centre for Forests (Bundesforschungszentrum für Wald, BFW). For details on the venue, please see Useful information ➔ Important Venues ➔ Icebreaker.

Before (at 5:00 pm) and during the later hours (at 9:00 pm) of the Icebreaker, we have arranged 2 special guided tours for you.

Detailed program

- 5:00 pm – 7:00 pm: **Guided tour through the Gardens of Schönbrunn Palace**

Meeting point:

We will meet at the main entrance of Schönbrunn Palace (right side of the gate).
The Organizing Committee will be present at the meeting point to welcome you.

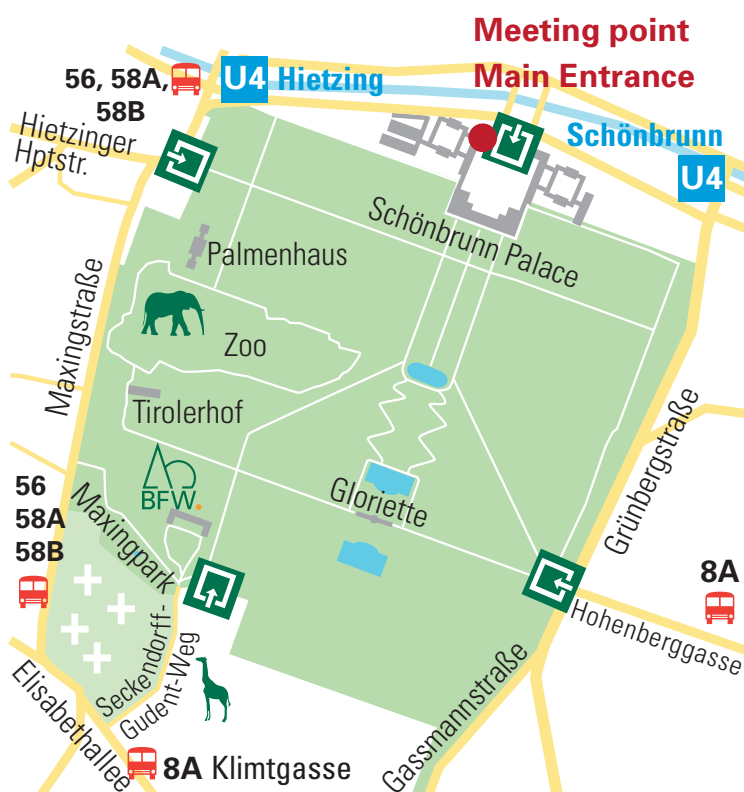
Please note:

The Icebreaker will begin at 7:00 pm, after the guided tour through the Gardens of Schönbrunn Palace.

We will pick up the participants of the tour through the Gardens of Schönbrunn Palace at the end of the tour, which will be at the "Gloriette", a special spot within the Gardens of Schönbrunn Palace. From the "Gloriette" you have a wonderful view to Schönbrunn Palace.

About the tour:

The Baroque park at Schönbrunn Palace originated from hunting grounds in the second half of the 16th century. The building of the palace at the end of the 17th century, of course, included the design and construction of elaborate gardens that took many years. During a guided tour through the gardens you will see the "Gloriette", numerous sculptures and fountains, and learn about the history of these spacious grounds. Since 1996 Schönbrunn Palace and its park are part of UNESCO's World Heritage sites. The tour will be provided by the Association of Licensed Guides of Vienna (www.guides-in-vienna.at).





- 7:00 pm – 10:00 pm: **Icebreaker (garden party) at the BFW**

The BFW is organising the 3rd International Conference on Landscape and Human Health, together with the BOKU Vienna.

Therefore, it is our pleasure to invite you to the BFW head office, which is located in Schönbrunn. The BFW head office is just a few walking minutes from famous sites such as Schönbrunn Palace, the Gardens of Schönbrunn Palace and the Tiergarten Schönbrunn (Vienna Zoo).

The registration desk at the Icebreaker opens at 7:00 pm.

Enjoy the pleasant atmosphere of the BFW gardens, meet old friends and get to know new colleagues.

The short opening ceremony of the Icebreaker starts at 7:30 pm. After the opening ceremony we will offer local foods and drinks at our garden party.

We also have prepared a special event for the courageous among you – the surprise involves trees and new perspectives. Be surprised!

- 9:00 pm – 10:30 pm: **Night Tour through the Tiergarten Schönbrunn (Vienna Zoo)**

Meeting point:

We will meet at the registration desk at the Icebreaker at 8:45 pm at the latest.

The Night Tour does not start at the general entrance of Tiergarten Schönbrunn.

For those of you, who will not attend the Icebreaker and only join the Night Tour, please meet us at the address given below. You can walk from "Hietzing" to "Maxingstraße 13b" in approx. 10 minutes, see map, page 10.

Address for the Night Tour through the Tiergarten Schönbrunn
Wirtschaftshofeinfahrt, Maxingstraße 13b
1130 Wien/Vienna

Please note:

Due to organisational reasons, the Zoo cannot permit entrances after 9:00 pm.

Therefore, the Organizing Committee will guide you from our meeting point at the registration desk to the meeting point for the Night tour, which is 12 walking minutes away from the Icebreaker.

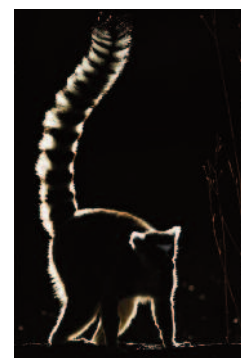
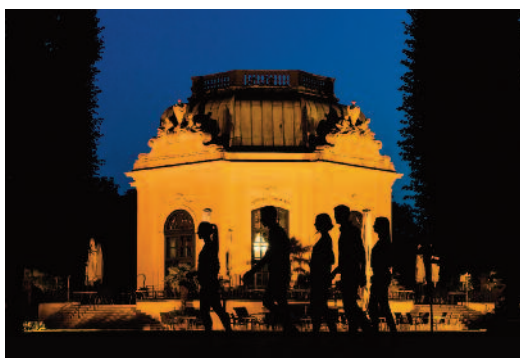
About the tour:

Equipped with Swarovski infrared binoculars (one device is used in pairs) and under professional guidance you can explore the mysterious world of sleeping and night active zoo animals.

More than half of all mammals are mainly active during the night due to the very speciose groups of bats and rodents which are in a large part nocturnal. But also several known zoo animals are not only active during the day. We will explore the special adaptations of nocturnal animals, but also investigate the sleeping behaviour of so called diurnal animals.

Among unforgettable impressions and interesting discoveries a highlight of the trip is the visit of the hippopotamus house where, at night, Egyptian fruit bats glide through the air like ghosts.

The tour will be provided by the Vienna Zoo (www.zoovienna.at).



PHOTOS: DANIEL ZUPANC



Excursion I and II, Friday, 19th May 2017

General information for both excursions

The guided excursions will give you insights into Austria's "Landscape and Health" projects. The excursions will take place outdoors - please bring suitable foot wear (hiking boots), waterproof clothing, sun protection and protection against ticks.

Please leave your luggage at the hotel. There is no facility to store your luggage at the conference venue.

Excursion I (West of Vienna)

Start at 01:30 pm, Diplomatic Academy of Vienna

Professional steering: Georg Wiesinger (BABF)

Organisational steering: Franziska Hütter (BFW), Christian Lackner (BFW)

We will visit two organic farms, "Passet-Jandrasists" and "3er-Hof". People with disabilities are integrated into the farming life, helping with easy tasks and enjoying creative work. Afterwards we will hike in the biosphere reserve "Wienerwald".

We will go by underground and tour coach.

End at 07:30 pm at the railway station "Wien Hütteldorf". Afterwards individual departure.

Excursion II (Northwest of Vienna)

Start at 01:30pm, Diplomatic Academy of Vienna

Professional steering: Arne Arnberger (BOKU), Renate Eder (BOKU)

Organisational steering: Sylvia Stadler (BFW), Brigitte Allex (BOKU)

We will visit the forest kindergarden "Gatschhüpfer" and the farm "Caritas am Himmel". The next programme point is a school for children with disabilities and a stop at the "Sisi chapel". A wonderful view over Vienna is guaranteed, while enjoying homemade juices.

We will end the day with a walk through biosphere reserve "Wienerwald".

The journey back to the city is individually organized by public transportation.

End at 06:30 pm.



greencare

Wo Menschen aufblühen

3rd International Conference on Landscape and Human Health: Forests, Parks and Green Care

May 17 - 19, 2017, Diplomatic Academy of Vienna, Austria

www.landscapeandhealth.at

Sessions

- Program Overview
- Program Outline
- Parallel Sessions



Program Overview

Wednesday, 17th May 2017

Icebreaker (garden party) at the BFW

- 05:00 pm: Guided tour through the Gardens of Schönbrunn Palace (optional - registration required)
- 07:00 pm: Registration desk opens
- 07:30 pm: Opening of the Icebreaker with Peter Mayer (BFW) and Hubert Dürrstein (BOKU)
Finger food and drinks
- 09:00 pm: Guided night tour through Tiergarten Schönbrunn (Vienna Zoo) (optional - registration required)

Thursday, 18th May 2017

Diplomatic Academy of Vienna

- 08:00 am: Registration desk opens
- 09:00 am: Conference opening with Peter Mayer (BFW) and Gerhard Mannsberger (BMLFUW),
moderated by Alexander Buck (IUFRO)

Keynote I by Mathew White
Keynote II by Yoon Youngkyoon
- 11:00 am: Coffee break
- 11:30 am: Parallel session I
- 01:00 pm: Lunch at the Diplomatic Academy
- 02:20 pm: Parallel session II
- 04:10 pm: Coffee break
- 04:30 pm: Parallel session III
- 08:00 pm: **Dinner at the „Heuriger 10er Marie“** (16th district of Vienna)

Friday, 19th May 2017

Diplomatic Academy of Vienna

- 08:00 am: Registration desk opens
- 08:45 am: Parallel session IV, coffee included
- 10:15 am: Official poster presentation, moderated by Peter Mayer (BFW)
- 11:10 am: Parallel session V, coffee included
- 12:40 pm: Poster award
Closing of the Conference
- 01:30 pm: Start of Excursion I (West of Vienna) and Excursion II (Northwest of Vienna) at the
Diplomatic Academy (optional - registration required)

Program Outline

Wednesday, 17 th May 2017	Thursday, 18 th May 2017	Friday, 19 th May 2017
BFW	Diplomatic Academy	Diplomatic Academy
	Registration desks opens (8 am)	Registration desks opens (8 am)
	Conference Opening and Keynotes (9 am)	Parallel Sessions IV (8:45 am)
		Forest III Garden II Policy and Planning I
	Coffee break (11 am)	Poster presentation (10:15 am)
	Parallel Sessions I (11:30 am)	Parallel Sessions V (11:10 am)
	Forest I Therapeutic Landscapes I People with Special Needs	Blue Spaces Therapeutic Landscapes II Policy and Planning II
	Lunch (1 pm)	Poster Award and Closing of the Conference (12:40 pm)
	Parallel Sessions II (2:20 pm)	
	Forest II Care Farms Rural Green Spaces	
	Coffee break (4:10 pm)	
	Parallel Sessions III (4:30 pm)	
	Urban Green Spaces Gardens I Children and Adolescents	
Guided tour through the Gardens of Schönbrunn Palace (5 pm - 7 pm)		Excursion I (West of Vienna) (1:30 pm - 7:30 pm)
Registration desks opens Gardenparty - Icebreaker (7 pm) (7:30 pm)		Excursion II (Northwest of Vienna) (1:30 pm - 6:30 pm)
Night tour through the Tiergarten Schönbrunn (Vienna Zoo) (9 pm - 10:30 pm)	Dinner at "Heuriger 10er Marie" (start 8 pm)	



Parallel Sessions

Thursday, 18th May 2017

Parallel Session I

Forest I: Forest planning and management for health and wellbeing

Thursday, 18th May 2017, 11:30 am - 1:00 pm

Session Chair: Alexander Buck

Room: Festsaal 2

- ▶ Elisabeth Johann (Austrian Forest Association, Austria)
Shaping the forests with regard to human health.
Concepts from the beginning of the 20th century compared to recent developments
- ▶ Ludmila Marusakova (FOREST EUROPE, Liaison Unit Bratislava, Slovakia)
Igor Viszlai
Enhancing the social dimension of Sustainable Forest Management in the context of the benefits of forests to human health and well-being
- ▶ Oscar Alexander Andersson (University of Copenhagen, Denmark)
Management of Urban and Peri-Urban Forests in Denmark and attitudes of forest owners - through a health perspective
- ▶ Michael Schulze (University of Applied Science Rapperswil (HSR), Switzerland)
Susanne Karn, Christine Bai
Development of Urban Forests in Urban and Suburban Areas of Switzerland

Parallel Session I

Therapeutic Landscapes I

Thursday, 18th May 2017, 11:30 am - 1:00 pm

Session Chair: Arnulf Hartl

Room: Festsaal 1

- ▶ Agnes van den Berg (University of Groningen, Netherlands)
Walking with the physiotherapist: an evaluation of a pilot program among ten physiotherapy practices
- ▶ Shirley Gleeson
(School of Health Sciences, Discipline of Health Promotion, National University of Ireland, Galway, Ireland)
Donal O'Keeffe, Margaret Barry
Feasibility of a Forest Therapy Intervention for Adults who are Experiencing Stress
- ▶ Karin Tanja-Dijkstra (VU Amsterdam, Netherlands)
Agnes van den Berg, Jolanda Maas
**Forest walking after rehabilitation:
a randomised controlled trial among patients with heart and vascular disease**
- ▶ Joe Hinds (Canterbury Christ Church University, Great Britain)
Experiences of psychotherapy outdoors from a client perspective: A qualitative exploration



Parallel Session I

Green spaces for people with special needs

Thursday, 18th May 2017, 11:30 am - 1:00 pm

Session Chair: Marjolein Elings

Room: Musikzimmer

- ▶ Tamara Muic (Faculty of Forestry, Serbia)
Mihailo Grbic, Dragana Skocajic, Andreja Tutundzic
**Design of playgrounds for children with intellectual disability:
Case study based on preference observation**
- ▶ Petra Hagen Hodgson (ZHAW, Switzerland)
Peter Eberhard
Green Spaces for the Second Half of Life
- ▶ Lidia Ponizy (Adam Mickiewicz University in Poznan, Poland)
Agnieszka Dziubała, Monika Latkowska
The meaning of contact with nature for seniors' well-being
- ▶ Christine Bai (University of Applied Science Rapperswil (HSR), Switzerland)
Inclusive planning and design of green open spaces for people with physical disabilities

Parallel Session II

Forest II: Forest recreation

Thursday, 18th May 2017, 2:20 pm - 4:10 pm

Session Chair: Liisa Tyrväinen

Room: Festsaal 2

- ▶ Matthias Wurster (Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg, Germany)
Andy Selter, Arno Röder
Modelling forest recreation in Baden-Württemberg, Germany
- ▶ Joachim Rathmann (University of Würzburg, Germany)
Christoph Beck
Quantifying ecosystem services of urban forests in the urban area of Augsburg
- ▶ Nicole Bauer (Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Social Sciences in
Landscape research, Switzerland)
Jacqueline Frick, Eike von Lindern, Marcel Hunziker
**Forest recreation: the role of childhood experiences, motives for visiting forests and the performed
activities for restoration**
- ▶ Emilia Janeczko (Warsaw University of Life Sciences, Faculty of Forestry, Department of Forest Utilization, Poland)
Małgorzata Woźnicka, Doro Kargul-Plewa, Wiesława Nowacka
Sport and Fitness running in Polish State Forest – Case Study
- ▶ Ulrike Pröbstl-Haider (Institute of Landscape Development, Recreation and Conservation Planning, University of
Natural Resources and Life Sciences Vienna, Austria)
René Moussong
Fitness training outdoors – opportunities for a new offer in urban forests and parks?



Parallel Session II

Effects of care farms on health and well-being

Thursday, 18th May 2017, 2:20 pm - 4:10 pm

Session Chair: Georg Wiesinger

Room: Festsaal 1

- ▶ Janka Horváth (Environmental Social Science Research Group, ESSRG, Hungary)
Bálint Balázs, György Pataki, Hajnalka Petrics
Care Farming in the making – Hungarian experiences
- ▶ Nicole Prop (Green Care Austria, Austria)
Green Care Auszeithof - preventive healthcare at a farm
- ▶ Aoibheann Walsh (Rural Support, Northern Ireland)
Social Farming in Northern Ireland: growth and development
- ▶ Sarah Hambidge (Bournemouth University, Great Britain)
What does it mean to young people to be part of a care farm: An evaluation of a care farm intervention for young people with behavioural, emotional and social difficulties
- ▶ Marjolein Elings (Wageningen University and Research, Netherlands)
Jan Hassink
Social farming in the Netherlands

Parallel Session II

Effects of rural green spaces on health and well-being

Thursday, 18th May 2017, 2:20 pm - 4:10 pm

Session Chair: Thomas Kistemann

Room: Musikzimmer

- ▶ Kayleigh Wyles (University of Surrey, Great Britain)
Mathew White, Melanie Austen, Caroline Hattam, Sabine Pahl, Stephen Herbert
Beneficial Effects of Nature: The Role of Quality and Type of Environment Visited on Individuals' Psychological Restoration and Connectedness to Nature
- ▶ Maria Meinert (Rheinische Friedrich-Wilhelms-Universität Bonn, Institute for Food and Resource Economics, Germany)
Requirements on landscape and agriculture
- ▶ Alexandra Jiricka-Pürner (Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences Vienna, Austria)
Valeria Tadini, Andrzej Tucki, Boris Salak, Giulio Senes
Exploring the wellbeing effect of Protected Areas - an intercultural comparison
- ▶ Kerstin Ensinger (Black Forest National Park, Germany)
Mindfulness matters: Mindfulness intervention fosters the health effects of nature
- ▶ Arne Arnberger (Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences Vienna, Austria)
Renate Eder, Brigitte Allex, Hans-Peter Hutter, Nicole Bauer, Mathias Hofmann, Johann G. Zaller, Thomas Frank
Restorative effects of managed and unmanaged Alpine meadows



Parallel Session III

Effects of urban green spaces on health and well-being

Thursday, 18th May 2017, 4:30 pm - 6:00 pm

Session Chair: Kathryn Bowen

Room: Festsaal 2

- ▶ Liisa Tyrväinen (Natural Resources Institute Finland, Helsinki, Finland)
Marjo Neuvonen, Harri Silvennoinen
Health effects of living in green environment – case study from Helsinki, Finland
- ▶ Brigitte Allex (Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences Vienna, Austria)
Arne Arnberger, Renate Eder, Hans-Peter Hutter, Peter Wallner
Human health related effects of different landscapes in the Wienerwald Biosphere Reserve
- ▶ Helena Nordh (Faculty of Landscape and Society, Norwegian University of Life Sciences, Norway)
Katinka Evensen
The green urban cemetery as a public health resource
- ▶ Lewis Elliott (European Centre for Environment and Human Health, University of Exeter Medical School, Great Britain)
Mathew White, Adrian Taylor, Charles Abraham
Improving the content of a riverside walking brochure using persuasive messages to heighten intentions to walk

Parallel Session III

Effects of gardens on health and well-being I

Thursday, 18th May 2017, 4:30 pm - 6:00 pm

Session Chair: Andy Kaufman

Room: Festsaal 1

- ▶ Birgit Steininger (University College for Agrarian and Environmental Pedagogy, Austria)
Haubenhofer Dorit, Cervinka Renate, Schwab Markus, Schlieber Hubert, Wolf Roswitha
Benefits of Gardens on Human Health and Well-being
- ▶ Renate Cervinka (University College for Agrarian and Environmental Pedagogy, Austria)
Markus Schwab
Affective relations are key elements for recreation in the garden
- ▶ Mathias Hofmann (Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Switzerland)
Christopher Young, Nicole Bauer
Effects of urban gardening on symptoms of chronic stress: A hair cortisol study
- ▶ Gaochao Zhang
(Department of Geosciences and Natural resource management, University of Copenhagen, Denmark)
Design with Aromatic Plants to Promote Mental Health



Parallel Session III

Effects of green spaces on children and adolescents

Thursday, 18th May 2017, 4:30 pm - 6:00 pm

Session Chair: Sjerp de Vries

Room: Musikzimmer

- ▶ Silvia Schäffer (GeoHealth Centre, Institute of Hygiene and Public Health, University of Bonn, Germany)
Thomas Kistemann
German forest kindergartens: Long term impacts on physical, mental and social well-being
- ▶ Janke van Dijk-Wesselius (Vrije Universiteit Amsterdam, Netherlands)
Jolanda Maas, Dieuwke Hovinga, Mark van Vugt, Agnes van den Berg
Greening school grounds: the benefits of greening a school ground on social-emotional and cognitive functioning of primary school children.
- ▶ Hans-Peter Hutter (Medical University Vienna, Austria)
Renate Eder, Brigitte Allex, Arne Arnberger, Marie Jansson, Peter Tappler, Lilly Damm, Michael Kundi, Peter Wallner
Reloading your batteries - a cross-over-experiment on restoration, cognitive performance and health of adolescents
- ▶ Thomas Schauppenlehner (Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences Vienna, Austria)
Verena Beiser, Irene Bittner, Doris Damyanovic, Rosa Diketmüller, Franz Mairinger, Martin Niegler
Methods for enabling adolescents in urban fabrics to monitor and reflect everyday physical activity



Parallel Sessions

Friday, 19th May 2017

Parallel Session IV

Forest III: Effects of forests on health and well-being

Friday, 19th May 2017, 8:45 am - 10:15 am

Session Chair: Peter Mayer

Room: Festsaal 2

- ▶ Sujin Park (Korea National Institute of Forest Science)
Mi-Ae Jeong, Ye-seul Jo, Cheolmin Kim
Phytoncide (Natural Volatile Organic Compounds) Concentration Analysis in Korea Pine Forest
- ▶ Tytti Pasanen (University of Tampere, Finland)
Kalevi Korpela
**Can psychological tasks strengthen restoration and improve mood?
Results from a forest walk experiment**
- ▶ Katharina Meyer
(University of Göttingen, Forest faculty, Chair of Nature Conservation and Landscape Management, Germany)
Stefan Hey, Renate Bürger-Arndt
Psychological and physical effects of walking through a German mixed stand forest
- ▶ Andy Kaufman (University of Hawaii, USA)
Arthi Padmanabhan, Paul Bolls, SangMi Lee, Roxanne Adams
To Tree or Not to Tree: People's Psychophysiological Responses to the Urban Landscape

Parallel Session IV

Effects of gardens on health and well-being II

Friday, 19th May 2017, 8:45 am - 10:15 am

Session Chair: Renate Cervinka

Room: Festsaal 1

- ▶ Chris Young (Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Switzerland)
Nicole Bauer
Gardening for good – comparing determinants of restoration in domestic and allotment gardens
- ▶ Markus Schwab (University College for Agrarian and Environmental Pedagogy, Austria)
Renate Cervinka
Relaxation and social activities in the garden promote perceived health
- ▶ Monika Latkowska (Warsaw University of Life Sciences, Poland)
Lidia Poniży
Application of horticultural therapy in Poland: experiences and prospects of its development
- ▶ Nadja Lobner (Gabriels Garten, Austria)
Gabriels Garten: Experiences as a Nature Coach in Working with Asylum Seekers



Parallel Session IV

Policy and planning I

Friday, 19th May 2017, 8:45 am - 10:15 am

Session Chair: Nicole Bauer

Room: Musikzimmer

- ▶ Christina Pichler (Paracelsus Medical University Salzburg - Institute of Ecomedicine, Austria)
Christian Salletmaier, Arnulf Hartl, Christina De Capitani, Iztok Altbauer, Barbara Ruffoni, Matthias Zink, Elisabeth Looch
EUSALP – An EU-makroregional strategy for the valorization of the Alpine region as globally attractive health promoting place
- ▶ Davide Pettenella (University of Padova, Italy)
Laura Secco, Maria Ninijk, David Miller, Elena Pisani, Riccardo Da Re, Catie Burlando, Mauro Masiero, Phoebe Koundouri, Achilleas Vassilopoulos, Antonio Lopolito, Diana Tuomasjukka, Nico Polman
Landscape effects on human health and well-being as elements of social innovation in marginalized rural areas: reflections on why and how to evaluate them
- ▶ Kathryn Bowen (Australian National University, Australia)
Yvonne Lynch
The public health benefits of green infrastructure: the potential of economic framing for enhanced decision-making
- ▶ Leide Takahashi (Fundação Grupo Boticário de Proteção à Natureza, Brazil)
Claudio Henschel De Matos, Marion Leticia Bartolamei Silva
Valuation Study of Social and Economic Benefits generated by Barigui Park in Brazil to Society

Parallel Session V

Effects of blue spaces on health and well-being

Friday, 19th May 2017, 11:10 am - 12:40 pm

Session Chair: Mathew White

Room: Festsaal 2

- ▶ Carina Grafetstätter (Paracelsus Medical University Salzburg - Institute of Ecomedicine, Austria)
Martin Gaisberger, Johanna Prosegger, Markus Ritter, Predrag Kolarž, Christina Pichler, Josef Thalhamer, Arnulf Hartl
Effects of green exercise and waterfall aerosol on mucosal immunity and chronic stress. A randomized controlled clinical trial
- ▶ Erwin Frohmann
(Institute for Landscape Architecture, University of Natural Resources and Life Sciences Vienna, Austria)
Max Moser, Vincent Grote, Alexander Avian
Psychophysiological effects of landscape's atmospheric qualities
- ▶ Ronan Foley (Maynooth University Ireland)
Exploring Health-enabling place: Swimming as an accretive practice
- ▶ Thomas Kistemann (GeoHealthCentre, Institute for Hygiene and Public Health, University of Bonn, Germany)
Re-vitalising urban waterfronts



Parallel Session V

Therapeutic Landscapes II

Friday, 19th May 2017, 11:10 am - 12:40 pm

Session Chair: Janez Pirnat

Room: Festsaal 1

- ▶ Stefan Türk (German Sport University Cologne, Germany)
Dominica Buchelt
The importance of experience-settings in therapeutic landscapes
- ▶ Arnulf Hartl (Paracelsus Medical University Salzburg - Institute of Ecomedicine, Austria)
Johanna Prosegger, Christina Pichler, Martin Niedermeier, Carina Grafetstätter
Nature therapy and green exercise as remedies for emerging civilization diseases
- ▶ Sjerp de Vries (Wageningen University & Research, Environmental Research (Alterra), Netherlands)
Fransje Langers, Jessie Meis, Brenda Berendsen, Stef Kremers
Landscape and lifestyle: the role of scenic beauty in staying active after an intervention
- ▶ Jean Larson (University of Minnesota, USA)
Nature Heals: People, plants, animals and the (re-)connection to health

Parallel Session V

Policy and planning II

Friday, 19th May 2017, 11:10 am - 12:40 pm

Session Chair: Arne Arnberger

Room: Musikzimmer

- ▶ Wei-Lun Tsai (North Carolina State University, USA)
Yu-Fai Leung, Melissa McHale, Myron Floyd
Effects of spatial resolution on the associations between urban green landscape and human health
- ▶ Wiesława Ł. Nowacka
(Warsaw University of Life Sciences, Faculty of Forestry, Department of Forest Utilization, Poland)
Małgorzata Woźnicka
Tourist recreation facilities of Warsaw forests focused on chosen users: women and the disabled
- ▶ Camilo Torres (Universidad Jorge Tadeo Lozano, Facultad de Ciencias Económicas – Administrativas, Colombia)
Gerard Verschoor
Humans, non-Humans and Health in the Amazon Forest
- ▶ Dinand Ekkel (Aeres University of Applied Sciences, Netherlands)
Sjerp de Vries
Evaluating accessibility metrics for healthy urban green space



greencare

Wo Menschen aufblühen

3rd International Conference on Landscape and Human Health: Forests, Parks and Green Care

May 17 - 19, 2017, Diplomatic Academy of Vienna, Austria

www.landscapeandhealth.at

Oral Presentation



Contents

Natural Environments and Human Wellbeing: Definitions of Wellbeing and Implications for Human-nature Research	
Keynote speaker – Mathew White	39
A New Forest Policy: Korea's Forest Welfare	
Keynote speaker – Yoon Youngkyoon	40
Human Health Related Effects of Different Landscapes in the Wienerwald Biosphere Reserve	
Brigitte Alex, Arne Arnberger, Renate Eder, Hans-Peter Hutter, Peter Wallner	42
Management of Urban and Peri-Urban Forests in Denmark and Attitudes of Forest Owners - through a Health Perspective	
Oscar Alexander Andersson	43
Restorative Effects of Managed and Unmanaged Alpine Meadows	
Arne Arnberger, Renate Eder, Brigitte Alex, Hans-Peter Hutter, Nicole Bauer, Mathias Hofmann, Johann G. Zaller, Thomas Frank ..	44
Inclusive Planning and Design of Green Open Spaces for People with Physical Disabilities	
Christine Bai	45
Forest Recreation:	
The role of Childhood Experiences, Motives for Visiting Forests and the Performed Activities for Restoration	
Nicole Bauer, Jacqueline Frick, Eike von Lindern, Marcel Hunziker	46
The Public Health Benefits of Green Infrastructure: The Potential of Economic Framing for Enhanced Decision-making	
Kathryn Bowen , Yvonne Lynch	47
Affective Relations are Key Elements for Recreation in the Garden	
Renate Cervinka, Markus Schwab	48
Landscape and Lifestyle: The Role of Scenic Beauty in Staying Active after an Intervention	
Sjerp de Vries, Fransje Langers, Jessie Meis, Brenda Berendsen, Stef Kremers	49
Evaluating Accessibility Metrics for Healthy Urban Green Space	
Dinand Ekkel, Sjerp de Vries	50
Social Farming in the Netherlands	
Marjolein Elings, Jan Hassink	51
Improving the Content of a Riverside Walking Brochure Using Persuasive Messages to Heighten Intentions to Walk	
Lewis Elliott, Mathew White, Adrian Taylor, Charles Abraham	52
Mindfulness Matters: Mindfulness Intervention Fosters the Health Effects of Nature	
Kerstin Ensinger	53
Care Farming in the Making – Hungarian Experiences	
Janka Horváth, Bálint Balázs, György Pataki, Hajnalka Petrics	54



Exploring Health-enabling Place: Swimming as an Accretive Practice Ronan Foley	55
Psychophysiological Effects of Landscape's Atmospheric Qualities Erwin Frohmann , Max Moser , Vincent Grote , Alexander Avian	56
Feasibility of a Forest Therapy Intervention for Adults who are Experiencing Stress Shirley Gleeson , Donal O'Keeffe , Margaret Barry	57
Effects of Green Exercise and Waterfall Aerosol on Mucosal Immunity and Chronic Stress. A randomized Controlled Clinical Trial Carina Grafetstätter , Martin Gaisberger, Johanna Prosegger, Markus Ritter, Predrag Kolarž, Christina Pichler, Josef Thalhamer, Arnulf Hartl	58
Green Spaces for the Second Half of Life Petra Hagen Hodgson, Peter Eberhard	59
What Does it Mean to Young People to be Part of a Care Farm: An Evaluation of a Care Farm Intervention for Young People with Behavioural, Emotional and Social Difficulties Sarah Hambidge.....	60
Nature Therapy and Green Exercise as Remedies for Emerging Civilization Diseases Arnulf Hartl, Johanna Prosegger, Christina Pichler, Martin Niedermeier, Carina Grafetstätter	61
Experiences of Psychotherapy Outdoors from a Client Perspective: A qualitative Exploration Joe Hinds	62
Effects of Urban Gardening on Symptoms of Chronic Stress: A Hair Cortisol Study Mathias Hofmann, Christopher Young, Nicole Bauer	63
Reloading Your Batteries - a Cross-over-experiment on Restoration, Cognitive Performance and Health of Adolescents Hans-Peter Hutter, Renate Eder, Brigitte Alex, Arne Arnberger, Marie Jansson, Peter Tappler, Lilly Damm, Michael Kundi, Peter Wallner	64
Sport and Fitness Running in Polish State Forest - Case Study Emilia Janeczko, Małgorzata Woźnicka, Dotor Kargul-Plewa, Wiesława Nowacka	65
Exploring the Wellbeing Effect of Protected Areas - An Intercultural Comparison Alexandra Jiricka-Pürner, Valeria Tadini, Andrzej Tucki, Boris Salak, Giulio Senes	66
Shaping the Forests with Regard to Human Health. Concepts from the Beginning of the 20th Century Compared to Recent Developments Elisabeth Johann	67
To Tree or Not to Tree: People's Psychophysiological Responses to the Urban Landscape Andy Kaufman, Arthi Padmanabhan, Paul Bolls, SangMi Lee, Roxanne Adams	68
Re-vitalising Urban Waterfronts Thomas Kistemann.....	69
Nature Heals: People, Plants, Animals and the (Re-)connection to Health Jean Larson	70
Application of Horticultural Therapy in Poland: Experiences and Prospects of its Development Monika Latkowska, Lidia Poniży.....	71
Gabriels Garten: Experiences as a Nature Coach in Working with Asylum Seekers Nadja Lobner	72



Enhancing the Social Dimension of Sustainable Forest Management in the Context of the Benefits of Forests to Human Health and Well-being	
Ludmila Marusakova, Igor Viszlai	73
Requirements on Landscape and Agriculture	
Maria Meinert	74
Psychological and Physical Effects of Walking through a German Mixed Stand Forest	
Katharina Meyer, Stefan Hey, Renate Bürger-Arndt	75
Design of Playgrounds for Children with Intellectual Disability: Case Study Based on Preference Observation	
Tamara Muic, Mihailo Grbic, Dragana Skocajic, Andreja Tutundzic	76
The Green Urban Cemetery as a Public Health Resource	
Helena Nordh, Katinka Evensen	77
Tourist Recreation Facilities of Warsaw Forests Focused on Chosen Users: Women and the Disabled	
Wiesława Ł. Nowacka, Małgorzata Woźnicka, Emilia Janeczko	78
Phytoncide (Natural Volatile Organic Compounds) Concentration Analysis in Korea Pine Forest	
Sujin Park, Mi-Ae Jeong, Ye-seul Jo, Cheolmin Kim	79
Can Psychological Tasks Strengthen Restoration and Improve Mood? Results from a Forest Walk Experiment	
Tytti Pasanen, Kalevi Korpela	80
Landscape effects on human health and well-being as elements of social innovation in marginalized rural areas: reflections on why and how to evaluate them	
Davide Pettenella, Laura Secco, Maria Ninijk, David Miller Elena Pisani, Riccardo Da Re, Catie Burlando, Mauro Masiero, Phoebe Koundouri, Achilleas Vassilopoulos, Antonio Lopolito, Diana Tuomasjukka, Nico Polman	81
The Meaning of Contact with Nature for Seniors' Well-being	
Lidia Poniży, Agnieszka Dziubała, Monika Latkowska	82
Fitness Training Outdoors – Opportunities for a New Offer in Urban Forests and Parks?	
Ulrike Pröbstl-Haider, René Moussong	83
Green Care Auszeithof - Preventive Healthcare at a Farm	
Nicole Prop	84
Quantifying Ecosystem Services of Urban Forests in the Urban Area of Augsburg	
Joachim Rathmann, Christoph Beck	85
EUSALP – An EU Macro-regional Strategy for the Valorization of the Alpine Region as Globally Attractive Health Promoting Place	
Christina Pichler, Christian Salletmaier, Arnulf Hartl, Christina De Capitani, Iztok Altbauer, Barbara Ruffoni, Matthias Zink, Elisabeth Looock	86
German Forest Kindergartens: Long Term Impacts on Physical, Mental and Social Well-being	
Silvia Schäffer, Thomas Kistemann	87
Methods for Enabling Adolescents in Urban Fabrics to Monitor and Reflect Everyday Physical Activity	
Thomas Schauppenlehner, Verena Beiser, Irene Bittner, Doris Damyanovic, Rosa Dikettmüller, Franz Mairinger, Martin Niegl	88
Development of Urban Forests in Urban and Suburban Areas of Switzerland	
Michael Schulze, Susanne Karn, Christine Bai	89
Relaxation and Social Activities in the Garden Promote Perceived Health	
Markus Schwab, Renate Cervinka	90
Benefits of Gardens on Human Health and Well-being	
Birgit Steininger, Dorit Haubenhofer, Renate Cervinka, Markus Schwab, Hubert Schlieber, Roswitha Wolf	91



Valuation Study of Social and Economic Benefits Generated by Barigui Park in Brazil to Society Leide Takahashi, Claudio Henschel De Matos, Marion Leticia Bartolamei Silva	92
Forest Walking after Rehabilitation: A Randomised Controlled Trial Among Patients with Heart and Vascular Disease Karin Tanja-Dijkstra, Agnes van den Berg, Jolanda Maas	93
Humans, Non-Humans and Health in the Amazon Forest Camilo Torres, Gerard Verschoor	94
Effects of Spatial Resolution on the Associations Between Urban Green Landscape and Human Health Wei-Lun Tsai, Yu-Fai Leung, Melissa McHale, Myron Floyd	95
The Importance of Experience-settings in Therapeutic Landscapes Stefan Türk, Dominica Buchelt	96
Health Effects of Living in Green Environment – Case Study from Helsinki, Finland Liisa Tyrväinen, Marjo Neuvonen, Harri Silvennoinen	97
Walking with the Physiotherapist: An Evaluation of a Pilot Program among Ten Physiotherapy Practices Agnes van den Berg	98
Greening School Grounds: The Benefits of Greening a School Ground on Social-emotional and Cognitive Functioning of Primary School Children Janke van Dijk-Wesselius, Jolanda Maas, Dieuwke Hovinga, Mark van Vugt, Agnes van den Berg	99
Social Farming in Northern Ireland: Growth and Development Aoibheann Walsh	100
Modelling Forest Recreation in Baden-Württemberg, Germany Matthias Wurster, Andy Selter, Arno Röder	101
Beneficial Effects of Nature: The Role of Quality and Type of Environment Visited on Individuals' Psychological Restoration and Connectedness to Nature Kayleigh Wyles, Mathew White, Melanie Austen, Sabine Pahl, Stephen Herbert	102
Gardening for Good – Comparing Determinants of Restoration in Domestic and Allotment Gardens Chris Young, Nicole Bauer	103
Design with Aromatic Plants to Promote Mental Health Gaochao Zhang	104



Natural Environments and Human Wellbeing: Definitions of Wellbeing and Implications for Human-nature Research

Keynote speaker

Mathew White

European Centre for Environment and Human Health, University of Exeter Medical School, Great Britain

Studying the relationships between landscapes, human health and well-being assumes we have a common understanding of what key terms such as 'wellbeing' mean. Currently, 'wellbeing' is being operationalised in the human-nature literature in a highly heterogeneous way. In some senses this is good, as it helps us discover which aspects of wellbeing are most receptive to which kinds of nature exposure. However such heterogeneity works best when the basic assumptions behind the different approaches to wellbeing are made explicit, and if there is some consistency in approaches across different research groups and studies, enabling us to compare, contrast and synthesise results.

The current talk will begin by outlining the three main 'families' of wellbeing definition in the philosophical literature. These have been referred to as 'Objective list accounts', 'Preference-based accounts' and 'Mental state accounts'. Each has a long tradition, many children, and even more grandchildren. Broadly speaking, different disciplines tend to use different definitions. If all three approaches came to the same conclusion about what makes for the 'good life', and the role natural environments play in this, all would be well. However although they do sometimes come to similar conclusions, often they do not. Thus it only makes sense to talk of landscapes being good for wellbeing if we know exactly which definition of wellbeing is being used in any given context.

Drawing on a number of well-known studies, as well as our own work at the European Centre for Environment

and Human Health, the talk will attempt to categorise outcomes explored in terms of these definitions, and highlight why apparent inconsistencies have been found. Against the backdrop of growing concern about the unreproducibility of experiments using small samples and the well documented problems of large scale but cross-sectional data, it will discuss some of our longitudinal work and attempts to exploit 'natural experiments' as a way of obtaining more robust findings.

The talk will conclude by arguing that all three families of 'wellbeing' definitions have their strengths and weaknesses and that each are valuable for research into landscape, health and wellbeing. Just as the field is coming to grips with defining what we mean by 'exposure', the time is ripe for us to become more explicit in what we mean by 'wellbeing'. We should not be nervous of the term. Depending on how we define and operationalise it, it is easily measurable, and results can be directly inform policy. The challenge now is to work together to make explicit the assumptions behind our preferred definitions, and start to coordinate our use of specific operationalisations across research centres in order to move forward in a logical and systematic fashion.

Keywords | Wellbeing, Human-nature relationship, Health outcomes



A New Forest Policy: Korea's Forest Welfare

Keynote speaker

Yoon Youngkyoon

The Korea Forest Welfare Institute, The Korea Forest Service, The Republic of Korea

1. Introduction to Forest Policy in Korea

During the Second World War and the Korean War, forests in Korea were exploited, which brought on huge disadvantages to people's living and life because of shortage in fuel. Consequently, forest scenes changed from dense woodlands to depleted lands. The Korean Government realized the seriousness of ensuing forest disasters, such as landslides and floods caused by the damaged forests and degraded lands. To reverse our forests and prevent forest disasters, the Korea Forest Service drew up the first and second national forest rehabilitation plan and enacted the Forest Law. Through a successful implementation of the plan and a systematic enforcement of the Law, and owing to the concerted efforts from the general people, we achieved a complete reforestation on our land over the last five decades by planting 9.5 billion trees. Thankfully, Korea's forest rehabilitation was internationally recognized by a lot of countries as a successful case of forest restoration.

As the result of the forest rehabilitation, Korea has expanded the forest cover up to approximately sixty-three percent of its total territory at present, and improved various public forest benefits such as water storage enhancement, erosion control, air quality improvement, timber production, and forest recreation function.

Recently, we are looking into new alternative functions and values of forest since perspective on forest has been shifting from a simple source of timber production to a natural place for healing and recreation which improves public health. Directions of forest policy are following the recent social trend in well-being which has been seen along with a growing demand for forest healing and recreation.

To realize sustainable forest welfare upon this social trend, we are leading 'Forest Welfare' which is to offer economic, social and emotional support for the improvement of people's welfare by providing forest welfare services such as culture, recreation, education and therapy activities based on forests.

2. Introduction to the Forest Welfare Policy in Korea

The Korean Government has been implementing forest policies over the past 50 years. Not only are we presenting a new slogan called 'Forest Welfare' by increasing demand for forest recreation, but also designing various forest welfare policies and strategies. To make a practical implementation of the forest welfare policy, we established Comprehensive Plan for Forest Welfare (2013) and enforced Forest Welfare Promotion Act (2016).

In response to diversified demands for forest services from the general public, the Korea Forest Service has set up the said comprehensive plan with the aim of provide forest benefits of recreation, culture, health and education to the general public and put efforts under the slogan of "From cradle to grave, life with forests". Accordingly, we tailored forest welfare services by each life cycle with seven stages:

- 1) birth
- 2) early childhood
- 3) childhood-adolescence
- 4) early adulthood
- 5) midlife- mature adulthood
- 6) late Adulthood and
- 7) after death

Benefits and forest services are delivered to all stages of human life cycle in a timely manner, contributing to the public welfare and enhancing the well-being of the Korean people. For instance, we offer eco-friendly funeral custom called 'Tree Burial' and provide forest recreation activities using forest trails and mountain leisure sports.

And The Korea Forest Service established The Korea Forest Welfare Institute to facilitate and perform these Forest Welfare Policies on the basis of Forest Welfare Promotion Act (2016). It has been established with a goal of improving people's health, quality of life and happiness through the promotion of forest welfare. Now,



The Korea Forest Welfare Institute is leading forest welfare culture with successful operation of new business such as Forest Welfare Service Voucher and Forest Welfare company registration system, etc.

3. Introduction to Forest Healing Policy in Korea

Forest healing is to strengthen immunity and increase human health using various elements of nature. Korea's forest welfare centers on forest healing which plays a key role in succeeding in forest welfare policy.

To back up forest healing policy, we have found out through researches and surveys that forest is one of the best places to solve psychological and physiological problems. Through research and development activities and the position of forest therapy and healing in the academic field, we have strengthened the scientific evidences on forest therapeutic functions and their effectiveness, revised forest healing-related acts and laws, and implemented the national forest plan.

Moreover, to offer the differentiated forest environments and to maximize the effectiveness of forest therapeutic functions, we have been creating healing forests and fostering forest healing human resources so called forest therapy instructors through training programs and license issuance.

4. Our Future Challenge

Recently, we made more and more efforts for improving the quality of life and recovering human health in forests and natural landscape. Many people have been supporting and being interested in scientific demonstrations that forest and nature can contribute to positive influences on humans as well as providing a variety of functions for human wellbeing in terms of recreation, education and culture. We try to improve the quality of human life based on providing a wide range of activities in forests and nature.

To expand the above tasks all over the world, the Korea Forest Service has been also established the International Association for Nature and Forest Welfare (NaFoW) which engages in finding methods for improving the quality of human life through activities connected to forest and nature. And the Korea Forest Service will exchange examples of outstanding policies and find ways for mutual development through bilateral and multilateral cooperation

Keywords | Forest Welfare, Healing, Therapy, Recreation, Culture, Education



Human Health Related Effects of Different Landscapes in the Wienerwald Biosphere Reserve

Brigitte Alex ^[1], Arne Arnberger ^[1], Renate Eder ^[1], Hans-Peter Hutter ^[2], Peter Wallner ^[2]

^[1] Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences Vienna, Austria

^[2] Institute for Environmental Health, Medical University Vienna, Austria

Background

As the urban European society is faced with a growing incidence of poor health because of mental stress and sedentary lifestyles, activities in rural and natural landscapes as well as in urban green spaces are increasingly seen as a counter to hectic city life. It is assumed those spaces can compensate for negative psycho-physiological effects on humans. Unfortunately, previous research on the assessment of psycho-physiological restorative effects of green spaces mostly contrasted built urban environments with natural environments but rarely compared different green spaces. The project HealthSpaces explores the question whether landscapes have positive effects on human mental and emotional health and whether these effects differ amongst various landscapes. The UNESCO Wienerwald Biosphere Reserve (Austria) was a useful field laboratory as it offers a scattered matrix of natural and cultural landscapes (meadows, beech and pine forests, pastures, vineyards and diverse forms of settlements) potentially providing health benefits to the public, particularly for the urban population of Vienna.

Methods

Standardised measurements of the psycho-physiological health-related landscape effects on participants (e.g. measuring of blood pressure and pulse, cognitive performance, self-condition scale by Nitsch, Perceived Restorativeness Scale, landscape preferences) were carried out in 5 selected landscape types of the Wienerwald Biosphere Reserve (forest, vineyard, pasture, small river embedded in a forest as well as an urban area for comparison measurements) on 5 days in May 2014. The participants (N=44; 20 males and 24 females representing all age groups above 18 years) spent about 45 minutes in each landscape type. The measurements were carried out before and after each site visit.

Results

The measurements showed that the visits in the green spaces had positive effects on the perceived well-being of the participants; the subjective stress level of the participants has been reduced and the subjective well-being has been improved during the experiment. After the visits of the four green spaces, the participants felt more relaxed, calmer as well as more content; in contrast, after the visit of the urban environment they were less relaxed, less calm and less content. The cognitive performance of the participants increased after the visit of the vineyards, forests and meadows whereas the results after the stay in the urban area showed contrary effects.

The meadow proofed to be the best restorative environment for the participants in terms of subjective recreational effects, perceived reduction of stress and perceived restoration of attention. The participants perceived the forest as second best restorative landscape because of its high naturalness. The participants rated the meadow and the forest as more restorative than the vineyard. The measurements showed, however, that the participants were more resilient and more concentrated after the visit of the vineyard.

Conclusion

The results show that human health effects differ among the landscapes and that these landscapes evoke different emotions amongst the participants. Landscape based health offers such as guided tours or other health related landscape based services can make use of the diversity of landscapes in the Wienerwald Biosphere Reserve to satisfy the needs of potential participants.

Keywords | Restorative effects, Standardised measurements, Biosphere Reserve Landscapes, Psycho-physiological effects



Management of Urban and Peri-Urban Forests in Denmark and Attitudes of Forest Owners - through a Health Perspective

Oscar Alexander Andersson

University of Copenhagen, Denmark

Very strong evidence supports the theory that urban and peri-urban forests play an important role for the promotion of people's health and well-being, as they are natural areas close to where people live. It is important, though, that the forests are designed and managed properly to function as a health supportive environment and that the forests are accessible enough to be visited.

Urban and peri-urban forests, hereafter abbreviated as UPUFs, are wooded areas in, or at the fringe of, urban areas. The study consists of three parts:

1. Through literature research characteristics of urban and peri-urban forests that make them restorative were investigated.
2. Through site analyses of five chosen forests in and at the fringe (within 3 km) of one Danish town, Kolding, mapping and investigation of current spatial and informational qualities in relation to mental restoration as well as physical activity was conducted.
3. Through interviews of six persons, representing seven forest owners, the study investigates Danish forest owners' perspective of UPUFs: their primary goals with their forests, their awareness regarding health

benefits from nature experiences, current management strategies of their forests in relation to human recreation of health promotion, their attitudes towards forest visitors and whether they as owners of UPUFs, see themselves as providers of health supportive environments.

The study revealed that there is a great potential for developing health promoting qualities in many of the UPUFs of Kolding with some minor adjustments in the management. One important finding is also that, among forest owners, there is a great difference in attitudes towards forest visitors, especially between owners of public and private forests, where owners of private forests are generally much more reluctant in their attitude towards visitors. To achieve success in improving health promotion in UPUFs, the greatest challenge is, in one way or another, to improve the willingness of private forest owners for their forests to be a place for health promotion of the citizens of the adjacent town.

Keywords | Urban forests, Accessibility, Management, Spatial qualities, Attitudes



Restorative Effects of Managed and Unmanaged Alpine Meadows

Arne Arnberger ^[1], Renate Eder ^[1], Brigitte Alex ^[1], Hans-Peter Hutter ^[2], Nicole Bauer ^[3], Mathias Hofmann ^[3],
Johann G. Zaller ^[4], Thomas Frank ^[4]

^[1] Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences Vienna, Austria

^[2] Institute for Environmental Health, Medical University Vienna, Austria

^[3] WSL, Birmensdorf, Switzerland

^[4] Institute of Zoology, University of Natural Resources and Life Sciences Vienna, Austria

Background

Changes in agricultural practices and policies, low farm income and depopulation of rural areas have resulted in the abandonment of traditionally managed mountainous landscapes globally and across the Alps. Such historic landscapes, e.g. alpine pastures, however, harbour a high biodiversity, attract tourists and may even positively influence human health. The Project Healthy Alps, financed by the Earth-System-Science-Programme of the Austrian Academy of Sciences, investigated linkages between human health and well-being, biodiversity and regulating ecosystem services in various mountainous meadows.

Methods

In 2015, short-term psycho-physiological health-related effects on study participants (N=22; 55 % females, age M=27) were assessed in the Austrian Großes Walsertal UNESCO Biosphere Reserve. Subjects visited twice a managed and an unmanaged meadow in a standardised manner on two consecutive days. The within-subjects variables were emotional well-being (Nitsch 1976) and physiological measures (pulse and blood pressure) before and after each site visit. Subjects rated perceived

restorativeness (PRS, Hartig et al. 1997) and health effects, scenic beauty, naturalness, and biodiversity of the meadows.

Results

Participants perceived the abandoned meadow as more natural and higher in biodiversity than the managed one, while no differences were found for scenic beauty of the meadows. Subjects perceived the unmanaged meadow to be similarly effective in reducing stress, restoring attention and improving well-being as the managed meadow, and they did assign both types the same restorative qualities (PRS). Subjective well-being increased and pulse decreased during the stay in both meadow types, while blood pressure increased. Overall, respondents perceived both alpine meadows as beautiful and restorative places, providing health benefits to them. However, this study also found some variability in the results between the managed and unmanaged meadows. An integration of additional study areas is requested.

Keywords | Mountain meadow; scenic beauty; psycho-physiological health-related effects; biodiversity



Inclusive Planning and Design of Green Open Spaces for People with Physical Disabilities

Christine Bai

University of Applied Science Rapperswil (HSR), Switzerland

In Switzerland live around one million people with physical disabilities in very different forms and degrees of severity. By considering the given projected aging of the population this number will increase in the future.

In urban open spaces people with disabilities are underrepresented, although green spaces (e.g. parks, playgrounds, cemeteries) represent an important health-promoting resource for the urban population. Although we have the Disability Equality Act and specific standards and guidelines in many places there are physical, social and psychological barriers that can lead to a lower utilization. Verifiably the proportion of people with disabilities in green open spaces does not correspond to their share in the overall population. This is leading to an unused health resource or even to a recorded negative effect on the health.

The UN Disability Convention (CRPD), which was ratified by Switzerland in 2014, calls for the inclusion of people with disabilities in all social life. Inclusion means the equal participation of all people in society and thus represents the antithesis of segregation and exclusion and goes beyond integration.

From this starting point, the following research questions are guiding through the study:

- What experience, knowledge and attitudes towards the use of green spaces do have people with disabilities?
- What are the advantages / qualities which are arising from an inclusive planning?
- How has inclusive planning to be implemented and in which planning phase has which topic to be considered?
- And finally which design variability is possible within the framework of an „ideal“ inclusive planning, in addition to the implementation of legal regulations and technical standards?

The oral presentation bases on the interdisciplinary project „Inclusive green spaces for people with disabilities“ (2015-2017), which was done in cooperation between University of Applied Science Rapperswil (HSR) and University of Applied Science Zurich (ZHAW) in Switzerland. In a first step, experience, knowledge and attitudes towards the use of green spaces were examined by qualitative interviews. The implementation of the immediate relevant statements of the interviews as well as the results of a literature review with a focus on the use and claim of public green open spaces by people with disabilities, resulted in a guide for inclusive planning and design. The guide was developed primarily from a process-oriented and design perspective. The gradual approach to the final product was closely accompanied by the core team research, which composes itself from people with and without disabilities, thus reflecting the inclusive approach / thoughts. Finally, the guide was examined and discussed in an experts' committee.

Outdoor recreation and the possibility to participate in social life are important criteria for human health. Green open spaces make a substantial contribution to this. To provide this potential to ALL people, certain principles can be taken into account in planning and design. People with disabilities want to participate in social life and also want to be involved in the planning process or in the organization of social services. A potential-oriented planning requires an intensive investigation of the local context and a careful weighing of interests. Inclusive designed green spaces allow you to immerse yourself in a sensual, rich space of experience for ALL recreation seekers and for that, creativity and the courage to design are required.

Keywords | Inclusive planning guide, people with physical disabilities, design of green open spaces, inclusion

References

- Abraham A. et al. (2007): Landschaft und Gesundheit: Das Potential einer Verbindung zweier Konzepte. Uni Bern
Seeland K., Nicolè S. (2006): Public green space and disabled users. Artikel
Windle et al. (2011): Preventing loneliness and social isolation: interventions and outcomes. Social Care Institute for Excellence (SCIE) briefing number 39



Forest Recreation: The role of Childhood Experiences, Motives for Visiting Forests and the Performed Activities for Restoration

Nicole Bauer ^[1], Jacqueline Frick ^[2], Eike von Lindern ^[3], Marcel Hunziker ^[1]

^[1] Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Social Sciences in Landscape research, Switzerland

^[2] ZHAW School of Life Sciences and Facility Management, Switzerland

^[3] University of Zurich, Switzerland

There is a growing interest in the potential role of the natural environment in human health and well-being. The main reason for this can be seen in the urbanization in many countries leading to a loss of natural areas for recreation. Additionally there is a rise of stress-related diseases in many countries that is caused by high workload and a sedentary lifestyle in many western industrialized countries.

Many research projects analyze how contact with natural environments can positively affect physical and mental health. Most of these projects focus on psychological restoration, which refers to the processes through which people recover adaptive resources that have become depleted by everyday demands. The need for restoration arises regularly and if a person cannot renew those resources he/she may not be able to cope effectively with new demands and over time. This can lead to mental and physical health problems (e.g. Hartig 2007).

In Switzerland forests get more and more important places for recreation. Ensuring adequate restoration is a matter of practical importance and in order to provide more substantial empirical basis for nature-based strategies for supporting psychological restoration we further explored the qualities of the forests contributing to restorative experiences and analyzed how demographic and other factors impact reported restoration.

In particular, we assessed

- a) environmental values and attitudes,
- b) the perceived relevance of forests during childhood,
- c) motives for visiting forests and
- d) activities performed in the forest and assessed their impact on the forest users' restorative experiences.

In order to further analyze the restorative experience we included the qualities of restorative experience namely, being away and fascination (Kaplan 1995) and the familiarity with the forest environment.

Methods

9356 households in Switzerland were randomly drawn by the Swiss Federal Statistics Office from telephone registers. Each household was informed by mail that one household member had been randomly chosen as a potential participant for a nationwide study on the human-forest relationship in Switzerland and that that person would be contacted by telephone. The participants could choose between an online-questionnaire and a telephone interview. A total of 3022 adults agreed to participate, giving a response rate of 32%. Of them, 1792 filled in the online questionnaire and 1260 were interviewed by telephone.

Results

Results of the linear regression analysis suggest that the self-rated importance of forests during one's childhood is a relevant predictor for the restorative experience during adulthood. Additionally, motives for visiting the forests as well as activities performed in the forest and the environmental attitudes are relevant for the restorative experience while the perceived qualities of the forest itself seem to be of minor relevance for restoration.

Especially the results concerning the relevance of childhood experiences for restorative outcomes lead to the additional question concerning possible mechanisms (e.g. effect of childhood experience on fascination and familiarity) that will be addressed in the presentation.

The findings provide valuable information for both environmental planning and for environmental education. The projects that aim at promoting health should hence start to target children and foster forest experiences during childhood.

Keywords | Restoration, recreation, childhood experience



The Public Health Benefits of Green Infrastructure: The Potential of Economic Framing for Enhanced Decision-making

Kathryn Bowen ^[1], Yvonne Lynch ^[2]

^[1] Australian National University, Australia

^[2] City of Melbourne, Australia

Cities are growing rapidly resulting in changing land cover and reduced levels of green infrastructure globally. Climate change adaptation is now becoming a critical agenda item for cities. The potential for ecosystem-based climate adaptation using a green infrastructure approach is appealing for many cities but the business case for implementation has to be made more effectively. There is a substantial body of evidence that shows green infrastructure is significantly beneficial for human health and wellbeing and that it has many applications for climate adaptation. Despite this evidence, the linkage between green infrastructure benefits and improved health outcomes remains to be adequately quantified. There are limited studies from the international grey literature that indicate the potential and substantial economic health value of green infrastructure. However,

these studies use different methodological frameworks, making it difficult to systematically evaluate and compare the monetary estimates. The explicit lack of peer-reviewed studies specifically evaluating the economic health value of green infrastructure projects highlights the need for such work to be undertaken. Addressing these research gaps would assist to accelerate policy development to drive the implementation of green infrastructure and ecosystem-based climate adaptation outcomes to support sustainable urban development. This paper reviews the current research areas and provides suggestions for future research and practice initiatives.

Keywords | global health, sustainability, climate change adaptation, economics, urbanisation



Affective Relations are Key Elements for Recreation in the Garden

Renate Cervinka, Markus Schwab

University College for Agrarian and Environmental Pedagogy, Austria

Gardens are spaces of beauty and recreation. Gardening is not only a popular leisure time activity, but is also applied in rehabilitation, Green Care and nature-assisted therapy. Thereby characteristics of both the place and activity are seen as key elements for fostering human health and well-being. Prior basic research on private gardens explored their perceived restorativeness (PR) and analysed predictors of PR using the perceived restorativeness scale (PRS: Hartig et al., 1997). Factorial analysis of the PRS supported a one factorial solution. The highlights of this research were: private green spaces scored high on perceived restorativeness, gardens were superior to other private green spaces with respect to restorativeness. A regression model explained 53.1 % of the variance of perceived restorativeness of private gardens, and the garden-user relationship (comprising six variables representing different aspects of relationship) qualified as the strongest predictor of perceived restorativeness.

This study – reanalysing the dataset of the prior study – is aimed at analysing the effects of gender, age and location with respect to PRS-predictors. In an online survey, 856 respondents rated PR of their own gardens. Additionally, questions on characteristics of the garden (e.g. size or number of different natural elements), socio-demographics of the respondents (e.g. age, sex), personal characteristics of respondents (e.g. detachment from work, perceived stress), and the relationship between user and garden (e.g. connectedness with the garden, satisfaction with the garden) were answered.

Reanalysing the data resulted in similar findings as found in prior research. The garden-user relationship qualified as the strongest predictor of the restorative potential, followed by the personal characteristics, the characteristics of the garden (in particular natural elements), and socio-demographic data. We did not find the expected differences in calculating the models for the three subgroups under study (gender, age, location). Explained variance and patterns of predictors in the regression models appeared quite similar, and in line with the general model.

The regression model seems to be robust and therefore appropriate for explaining restorative mechanisms of private gardens for different groups of garden users. We discuss findings as contributing to a general theoretical background explaining the restorative power of gardens. Based on the results we propose three recommendations: First, pay attention to the importance of affective bonds in designing restorative gardens, private gardens as well as public gardens. Second, carefully attend to the personal relationship between clients and nature in using landscapes for care or therapy. Third, add diverse natural elements to gardens to make green spaces more restorative.

Keywords | Connectedness with nature, green space, restoration



Landscape and Lifestyle: The Role of Scenic Beauty in Staying Active after an Intervention

Sjerp de Vries^[1], Fransje Langers^[1], Jessie Meis^[2], Brenda Berendsen^[3], Stef Kremers^[2]

^[1] Wageningen University and Research, Environmental Research (Alterra), Netherlands

^[2] NUTRIM School of Nutrition and Translational Research in Metabolism, Maastricht University, Netherlands

^[3] Department of Psychology and Educational Sciences, Open University of the Netherlands, Netherlands

This study investigates the role of the local landscape in the long-term success of a combined lifestyle intervention for inactive people with overweight, the so-called 'Beweegkuur'. Part of the intervention is that participants are introduced to local activity and exercise opportunities. During the intervention, they can try out different activities and at its end they are encouraged to choose an activity that suits them, to help them to sustain the activity level reached at the end of the Beweegkuur. Central questions are:

1. Does the local green infrastructure influence the choice of activity at the end of the 'Beweegkuur'?
2. Does the chance that people still practise the chosen activity one year after the 'Beweegkuur' depend on which activity was chosen?
3. More in general, does the local green infrastructure influence the long-term success of the 'Beweegkuur' in terms of maintaining the physical activity level reached at its end?

Thanks to two already conducted evaluation studies, data were available on choice of activity at the end of the Beweegkuur (n = 105), continued participation in that activity after one year (n = 71) and self-reported physical activity levels, regardless of activity chosen, at the end of the Beweegkuur and one year later (n = 190). These data were enriched with, among others, the scenic beauty of the landscape surrounding one's place of residence (i.e., within 2.5 km), which was assessed by means of the GIS-based Landscape Appreciation Model (GLAM, version 2).

The five most popular activities (in descending order) were cycling, walking, fitness, gardening/doing odd jobs and swimming. Local scenic beauty was positively associated with the choice for walking and swimming, and negatively with that for (indoor) fitness. Of these five activities, fitness was most likely to be discontinued after one year. As for the third question, local scenic beauty was negatively associated with a drop in activity: one point increase on the 10-point scenic beauty scale was associated with a decrease in the odds of having become less active after one year by a factor of 0.7 ($p < 0.05$). Additional analyses showed that drops were mainly due to fewer minutes of vigorous physical activity.

Taken together, the results strongly suggest that fitness is an activity that is relatively hard to sustain. At the same time, the choice of activity is associated with, and therefore might be influenced by, the scenic beauty of the local landscape, with walking being more often preferred and fitness less often in more beautiful surroundings. However, such a causal interpretation of the observed association is open to discussion. Finally, whereas it may be difficult to change the scenic beauty of the landscape in the short run, lifestyle intervention programs might be more successful if they guide participants to easier to sustain activities, such as walking and cycling.

Keywords | Overweight, lifestyle intervention, physical activity, green infrastructure, scenic beauty



Evaluating Accessibility Metrics for Healthy Urban Green Space

Dinand Ekkel^[1], Sjerp de Vries^[2]

^[1] Aeres University of Applied Sciences, Netherlands

^[2] Wageningen University Research, Netherlands

It is widely recognized that contact with nature has the potential to positively contribute to human health and well-being. If one wants to develop healthy urban neighbourhoods, questions can be raised about how to translate the scientific evidence into practical guidelines. Contact with nature presupposes access. This presentation gives an overview of quantitative and qualitative aspects of access to nature and empirical studies addressing these aspects in relation to health. Comparing results across studies proved to be not very easy; access to nature was measured in a variety of ways and the accessibility metric that was chosen was often not problematized. However, we found a few studies who compared different types of accessibility metrics. These studies suggest that cumulative opportunities indicators are more consistently positively related to

health than residential proximity ones. In contrast to residential proximity indicators, cumulative opportunities indicators take all the green space within a certain distance into account, rather than only the nearest green area of a certain minimum size. We argue that a more function-oriented approach to access and accessibility metrics is needed. How precisely is contact with nature expected to positively affect health and what type of nature and additional qualities are likely to be relevant in this regard? Answers to such questions will help to develop more suitable accessibility metrics, on which more effective guidelines for urban planning may be based.

Keywords | Health, urban green space, nature, urban planning, accessibility metrics



Social Farming in the Netherlands

Marjolein Elings, Jan Hassink

Wageningen University and Research, Netherlands

Introduction

The number of care farms in Europe are growing. Specific for the Netherlands the number has grown to over more than 1,100 with more than 20,000 clients. Care farms are enterprises where farming and health-care are combined. These farms open their gates for people that need care or a sheltered workplace in a natural environment. Care farms direct their services towards many different client groups: people with learning difficulties, people with mental health problems, elderly.

Effect studies

Over the last few years, various studies have been implemented on the effects of working and living on care farms for different client groups. From these studies

- research on a special programme for youngsters with behavioural disorders show a significant decline in behavioural problems, improved contact with their family and more self-esteem.
- an effect study on people suffering from mental ill health or drug and alcohol addiction history noted an improved condition, appetite, self-esteem and self-respect.
- a study reveals that older dementia patients who participated in day care on a farm have a significant better nutritional status, having a higher intake of energy and fluid than peers in regular day care.

Next to that qualitative research shows that clients, care providers and farmers experience the care farm as a unique facility. Care farms combine the personal engagement of the farmer and social workers, a safe community, green environment and a range of useful and diverse activities.

Use of research results in the sector

Together with the Federation of Care Farmers, researchers organised meetings with care farmers in various regions of the Netherlands. The aim of these meetings was to use the academic results in the daily practice of social farms: do farmers recognise the results and how can the results be translated into practice? For example: from different studies it became clear that animals have a positive effect on self-esteem of clients. From the feedback of the farmers it seems that the majority of farmers do not use animals for specific learning goals of clients but mostly just for agricultural production. In this way the results of effect studies can be an eye-opener for farmers to specifically use qualities of their farm in the development and care for clients.

A second aim of the meetings was to discuss how the results of the studies can be used to put forward what social farmers do on their care farm. Especially in the fast changing financial health care system in the Netherlands it is a must for social farmers to be explicit in what they do on their social farm and to show what the positive effects on clients are.

Aim of presentation

In our presentation we would like to discuss how we use scientific results in the social farming sector in the Netherlands. We would like to exchange with the audience their experiences on this topic in their country.

Keywords | Care farm, effect study, green care, implementation

References

- Bruin, S. (2009) Sowing in the autumn season. Exploring benefits of green care farms for dementia patients. Wageningen: Wageningen University.
Elings, M. (2011) Effects of care farms. Scientific research on the benefits of care farms for clients. Wageningen: Taskforce Multifunctional Agriculture.
Hassink, J., M. Elings, M. Zweckhorst, N. van den Nieuwenhuizen & A. Smit (2009) Care farms in the Netherlands: Attractive empowerment-oriented and strengths-based practices in the community. *Health & Place* (2010): 423-430.



Improving the Content of a Riverside Walking Brochure Using Persuasive Messages to Heighten Intentions to Walk

Lewis Elliott ^[1], Mathew White^[1], Adrian Taylor ^[2], Charles Abraham ^[3]

^[1] European Centre for Environment and Human Health, University of Exeter Medical School, Great Britain

^[2] Peninsula Schools of Medicine and Dentistry, Plymouth University, Great Britain

^[3] Psychology Applied to Health, University of Exeter Medical School, Great Britain

Natural environments are a promising setting for promoting certain physical activities such as recreational walking. However, at present, common forms of recreational walking promotion (e.g. brochures), have been largely targeted at people who are already active and often neglect theory-derived persuasive techniques which could strengthen walking intentions for less active people. The aim of this study was to investigate whether enhancing brochures with theory-derived persuasive techniques strengthens intentions to walk in natural environments for irregular walkers.

A between-subjects online experiment exposed 402 British adult participants to either: (a) an extract from an existing recreational walking brochure advertising a riverside walk; or (b) an 'enhanced' brochure which maintained the format of the original extract but included messages targeting the antecedents of intention formation proposed by the theory of planned behaviour, a psychological theory of behaviour change which posits that intentions are formed from the coalescence of instrumental and affective attitudes, normative beliefs, and perceived behavioural control.

Key outcome variables included stated intentions (self-report scales) and revealed intentions (requests for further walking information or not), and these were informed by conventions in measuring theory of planned behaviour constructs. Path analytic regression models tested whether antecedents of intention formation

mediated differences in stated and revealed intentions between individuals exposed to the existing brochure and those exposed to the 'enhanced' brochure. These models controlled for potential demographic confounds as well as people's propensity for visiting natural environments and undertaking regular recreational walking.

Supporting the main hypothesis, stated intentions were higher after reading the enhanced brochure compared to the original brochure. Further supporting our predictions, irregular walkers had stronger stated and revealed intentions for walking in natural environments after reading the enhanced brochure vs. the original brochure. These effects were partially mediated by differences in attitudes, descriptive norms and efficacy beliefs. However, regular walkers had stronger revealed intentions after reading the original brochure.

Regular and irregular walkers are motivated to walk in riverside environments by different types of content. Authors of recreational walking materials should consider behavioural theory in the design of brochures in order to engage inactive individuals in outdoor recreational walking. Tailoring brochure content to different ability levels seems a promising avenue for future application.

Keywords | Physical activity, River, Theory of planned behaviour, Persuasion



Mindfulness Matters: Mindfulness Intervention Fosters the Health Effects of Nature

Kerstin Ensinger

Black Forest National Park, Germany

Scientific evidence has shown the restorative effect of natural environments (Kaplan and Kaplan 1989, Ulrich 1991). Mindfulness is described as paying attention in a particular way: on purpose, in the present moment, nonjudgmentally and characterized by curiosity, openness and acceptance (Kabat-Zinn, 1994). Mindfulness intervention, aiming to evoke attention to present, could therefore make an important contribution to the health effect of landscape experience. The hypothesis of an intervention study conducted by the Black Forest National Park was that this restorative effect does not only depend on external criteria, but also on a person's inner attitude. Scientific studies exploring this contribution have not been conducted so far.

The Black Forest National Park offers a unique diversity of landscapes from cultural landscape to wilderness characterized by structural diversity and deadwood components. The experimental study conducted in the summer of 2016 aimed at exploring the effect of a walk through different types of landscapes. The sample consisted of $n = 112$ participants who were randomly assigned to one of two experimental conditions: mindfulness training before or after the walk. The research design of the study followed a comprehensive mixed method approach which generated data on different levels. During the walk the participants wore a sensor wristband which generated psychophysiological data. These physiological reactions were calibrated through a previous test as either curiosity-related ("positive") or fear-related ("negative"). Second, data aimed at the perceived restorative effect of the different landscapes were collected with a

smartphone app. In addition standardized psychological tests such as an attentional blink and a stress test conducted before and after measured the restorative effect of the landscape experience. And last, a GPS tracker continually traced a person's position during the walk so that an "emotional map" of the entire walk could be created. Treatment effects on subjective self-report and cognitive-affective data were analyzed by multivariate logistic and OLS regression analyses with treatment as binary predictor (1=treatment, 0=no treatment), whereas effects on psychophysiological arousal score were estimated by multivariate mixed models taking the hierarchical structure of inter- and intra-subject data into account.

The results of the study indicate that mindfulness intervention does make a difference: All participants who underwent the mindfulness intervention reported higher restorative effects of their walk than their counterparts who underwent no such intervention. The mindfulness intervention also influenced people's psychophysiological reactions measured by the sensor wristband. These people reacted in a much more sensible way to the different types of landscapes, i.e. their arousal levels were often higher than the control groups'. This higher arousal correlated with improved attention capacity and better stress coping. In conclusion, the study points to the great potential of mindfulness: both for its health effect in combination with landscape experience and for nature conservation more generally.

Keywords | mindfulness intervention, restoration, nature conservation, mixed method approach



Care Farming in the Making – Hungarian Experiences

Janka Horváth ^[1], Bálint Balázs ^[1], György Pataki ^[1], Hajnalka Petrics ^[2]

^[1] Environmental Social Science Research Group, ESSRG, Hungary

^[2] FAO, Italy

Social/care farming (SCF) is an innovative approach to nature-based activities and services organised at farm level with well-established discourses in Western Europe relating to the multifunctionality of agriculture, rural development, social inclusion, etc (Dessein and Bock, 2010). Built on the principles of social solidarity, as well as social and environmental awareness raising, SCFs are cooperative production units, that involve people with disability in the production, processing and service activities; and also provide agricultural awareness raising for the benefit of the society. The benefits for the target groups can include rehabilitation, social inclusion (disadvantaged persons integrate back into society), skills development combined with the feeling of utility and self-appreciation), social inclusion. In Hungary, the concept of social farming only recently reached momentum and entered the public discourse. In the Hungarian context we explored that the rural development policy could have a special role to facilitate SCF initiatives. The presentation will draw upon the state of the art of SCF in Hungary, and also identify the emerging actors and future prospects of SCF in Hungary. We build on our own participant observation experiences ranging from the first forum on SCF in Hungary (January 2014) and on three community of practice meetings of experts in 2015 under the auspices of a Norwegian Fund project. Furthermore, the present study builds upon field visits to producers who work with disadvantaged

people by focusing on their capabilities. Our results suggest that in Hungary, the concept of SCF is nearly unknown, while in Europe it has high level political acknowledgement. In Hungary SCF is only rarely considered by stakeholders as rural development; however in the international academic literature SCF is by definition a means of rural development as it revitalises rural areas and repositions the role of rurality in society, e.g. by making it more desirable, accessible, and altogether more helpful for the society. Although we could identify a few common threads among the stakeholders of this field in the making it is early to draw firm conclusions. It seems that the SCF sector in Hungary is still not appropriately positioned in the public policy domain. This could lead SCF enterprises to be more motivated by the employment funds whereas the rural development funds are difficult to obtain for this sector. As a dominant organizational form, autisms'' manors do not necessarily engage in agricultural activities themselves; therefore cannot be supported through the LEADER programme. To reach broader audience and more public support the SCF sector needs to identify potential users (who they are, what the main benefits are for them) and create appropriate business models to engage with these target groups.

Keywords | Social and care farming, stakeholder forum, Hungary



Exploring Health-enabling Place: Swimming as an Accretive Practice

Ronan Foley

Maynooth University, Ireland

Writing on therapeutic landscapes and healthy spaces increasingly overlaps with a number of disciplines beginning to explore through a range of methodologies how healing emerges in place, using a range of experimental, measurable and experiential approaches. Most importantly, initial assumptions as to the value of nature to human health are being challenged to uncover more fully exactly how specific green and blue spaces work to enable health (Duff, 2012).

As one empirical blue space study, this paper recounts a primarily qualitative approach that uses a mix of ethnography and oral history to identify how swimming practices enable health at a number of representative sites in Ireland. Based on detailed interviews with twenty regular outdoor swimmers at established swimming locations on three of Ireland's coasts, open-ended questions explored individual swimming lives and the factors that shaped a generally positive lifelong practice. Around a third of the swimmers had some form of illness and/or disability.

The evidence gathered suggests that for swimmers, the act of swimming worked as an enabler of both physical and mental health across the life-course, with particular focus on impairment, illness recovery and the wider value of shared socialisation. For the disabled

land-body, being in the water transformed bodily capacities, while a number of cancer 'survivor' groups were also prominent users. Finally, the value, especially to older swimmers, of shared social dimensions were identified as central to a repeated engagement in a healthy practice. At the same time, an awareness of risk and negative outcomes and experiences also formed part of the narrative.

A secondary outcome from the work was the identification of a form of therapeutic accretion from the act of swimming, wherein both physical and mental resilience emerged from the intermingling of bodies and spaces over time. In utilising the metaphor of accretion, a resilient crust/skin is built up on the body over time, though the nature and form of that accretion works differently across different bodies and in specific places, both coastal and inland. Finally, the importance of often hard to articulate emotional benefits were identified as a hitherto under-played element in wider discussions of how to value natural environments and therapeutic settings.

Keywords | Swimming, Blue Space, Therapeutic Landscapes



Psychophysiological Effects of Landscape's Atmospheric Qualities

Erwin Frohmann ^[1], Max Moser ^[2], Vincent Grote ^[2], Alexander Avian ^[2]

^[1] Institute for landscape architecture, University of Natural Resources and Life Sciences Vienna, Austria

^[2] Joanneum Research Weiz, Austria

Approaching space in a contemplative manner has shown that landscapes possess varying forms of atmospheric qualities which impact human psyche and body. This space atmosphere relies on its aesthetic effects but is complemented rather by its synaesthetically effects. The Philosopher Teilhard de Chardin (1959) in this case is speaking of "Noosphere" - as the spirit dimension of landscape. Accordingly any space builds up a characteristic on atmospheric and noospheric phenomena.

Thus encountering space more profoundly sets off physical and emotional processes which, via the vegetative system, can have a calming or stimulating effect on humans. The present study investigates the psychological and physical effects of the space atmosphere of varying landscapes on the state of humans. The concrete objective is to analyze the effect of various landscape locations on the physical, emotional and mental wellbeing of humans with the means of heart frequency analysis and the Basel Mood Inventory. Tuning in to experience the location in a contemplative way, allows a more profound encounter with space and the perception of self is enhanced by the landscape. In our project at hand the human serves as the indicator for ascertaining space qualities. In this manner the effect or rather the psycho-physiological reaction of the cardiovascular system (HRV) – the vegetative nervous system (with the heart man) and the subjective perception – wellbeing (with Basel Mood Inventory) – is observed.

In a within subjects experimental design, 14 persons were asked to stand with their eyes closed in contemplative silence at three different locations around

Krimmler Waterfalls in Austria – close to a waterfall, in a small forest and in rocky terrain with boulders. The method of heart rate variability, which measures the cardiovascular system, was used to survey the physiological reactions and the Basel Mood Inventory was applied to monitor psychological and emotional effects. The central aspect of the methodological set up was that the test persons repeatedly stood at the three different locations for 10 minutes. While doing so their heart rate variability was measured. The mood was noted down at the end of each phase. In practice the testing consisted of 9 standardised measuring units of 10 minutes each. This scheme was repeated the next day in reverse order.

The results of the physiological data show significant variations among the individual landscapes. Test persons heart rates were the most activated at the waterfall. Vegetative relaxation was the highest in the forest. The results of the rock place lies between. Mood ratings showed that test persons felt more active and vital at the waterfall than at either of the other locations. Further the study's results show that physical and psychological reactions prove that outer space will reflect as an atmosphere and noosphere perceived internally and thus influence the state of a person. The rhythmical, emotional and mental interplay of space and human is experienced in contemplation and has its physical impact on the body. In this way different spaces of landscapes can be used as health retirement places.

Keywords | Space perception, landscape, recreation, space effect, cardio-vegetative regulation



Feasibility of a Forest Therapy Intervention for Adults who are Experiencing Stress

Shirley Gleeson ^[1], Donal O'Keeffe ^[2], Margaret Barry ^[1]

^[1] School of Health Sciences, Discipline of Health Promotion, National University of Ireland, Ireland

^[2] School of Nursing and Midwifery, Trinity College Dublin, Ireland

Problem

The social, economic, and medical costs of stress are substantial. Stress negatively impacts mental health, physical health, wellbeing, and quality of life. Exposure to stress and stressful events causes disease through biological pathways (by damaging immune functioning) and behavioural pathways (by triggering negative behavioural responses such as an increase in alcohol consumption, unhealthy food choices, or a reduction in physical activity). There is an emerging evidence base demonstrating the efficacy of Forest Therapy (also known as forest bathing or Shinrin-yoku) in terms of stress reduction. Contact with nature can offer a practical approach for population-based mental health promotion. Evidence exists to support the use of nature for primary, secondary, and tertiary stress prevention. As well as promoting stress recovery and mental fatigue restoration, nature contact can act as buffer against the health impacts of stressful events.

Methods

This is a mixed method feasibility study examining a standardised, six-week, Forest Therapy intervention for adults experiencing stress in Ireland. Acceptability, practicality, and implementation were assessed and limited efficacy testing was conducted. The intervention comprised a weekly two-hour Forest Therapy intervention delivered over six weeks. The effect of the intervention on stress levels, rumination and well-being was tested using self-reported measures administered

pre and post intervention. Participants' experience of the intervention was explored using written reflections and a focus group. Feasibility was assessed using a focus group, outcome measure analysis, attendance rates, and process evaluation. Quantitative data were analysed in SPSS by available case analysis. Descriptive and inferential statistics were calculated. Qualitative data was analysed using thematic analysis.

Results

Findings provide promising support for the intervention's feasibility and acceptability. Statistical significant improvements in stress levels, rumination levels, and well-being were found post intervention. The following themes regarding the experience of intervention participation were identified: Connectedness, Just Being, Awareness, Nature as Healer, Integration, Relaxation, and Support.

Conclusion

Forest Therapy is a feasible stress management intervention. Further research is required to establish the potential of Forest Therapy in the arena of mental health promotion. This will determine if health service providers and policy makers should consider integrating Forest Therapy into the health care system.

Keywords | Forest Therapy, Stress, Well-being, Health Promotion, Feasibility



Effects of Green Exercise and Waterfall Aerosol on Mucosal Immunity and Chronic Stress. A randomized Controlled Clinical Trial

Carina Grafetstätter ^[1], Martin Gaisberger ^[3, 4, 5], Johanna Prosegger ^[2], Markus Ritter ^[3, 4, 5],
Predrag Kolarž ^[6], Christina Pichler ^[1], Josef Thalhamer ^[7], Arnulf Hartl ^[1]

^[1] Paracelsus Medical University Salzburg - Institute of Ecomedicine, Austria

^[2] Institute of Ecomedicine, Paracelsus Medical University, Austria

^[3] Institute of Physiology and Pathophysiology, Paracelsus Medical University, Austria

^[4] Gastein Research Institute, Paracelsus Medical University, Austria

^[5] Department for Radon Therapy Research, Ludwig Boltzmann Cluster for Arthritis and Rehabilitation, Austria

^[6] Institute of Physics, University of Belgrade, Serbia

^[7] Department of Molecular Biology, University of Salzburg, Austria

Background

Green exercise in the protected area of the Nationalpark Hohe Tauern (Austria) and the specific microclimate of alpine waterfalls with high levels of ionized water aerosols has been suggested to trigger beneficial health effects. In the present three-armed randomized controlled clinical study (n=102) we focused on important medical and physiological functions of human health: (i) immune reactivity, (ii) physiological stress response and (iii) stress-related psychological parameters.

Methods

102 participants with moderate to high stress levels (health professionals) were included in the present study. Two groups (n=65) spent an active sojourn with daily GPS controlled hiking tours in the Nationalpark Hohe Tauern (Großkirchheim, Austria). One group was exposed to water aerosol of an alpine waterfall for one hour per day (first arm, n=33), whereas the other group spent the same time at a distant site (second arm, n=32). A third arm (control, n=26) had no intervention (except vaccination) and stayed at home, maintaining their usual lifestyle. The effect of the interventions on the immune system was tested by oral vaccination with an approved cholera vaccine and measuring salivary IgA antibody titers. Lung function was determined by peak expiratory flow measurement. Electric skin conductance, heart rate and adaptation of respiration rate were assessed as

physiological stress parameters. Psychological stress-related parameters were analysed by questionnaires and scales.

Results

Compared to the control group, both intervention groups (green exercise and green exercise + waterfall) showed improvement of the lung function and of most physiological stress test parameters. Analysis of the mucosal immune response revealed a waterfall-specific beneficial effect with elevated IgA titers in the waterfall-group. In line with these results, exposure to waterfall revealed an additional benefit concerning psychological parameters such as subjective stress perception (measured via visual analog scale), the Global Severity Index (GSI) and the Positive Symptom Total (PST).

Conclusion

Our study provides new data that strongly supports a beneficial health effect of green exercise and waterfall microbiota on immune function, physiological and psychological stress parameters. An active sojourn in the protected area Nationalpark Hohe Tauern can be an efficient measure for the prevention of stress and burnout.

Keywords | Green Exercise, Protected areas, Waterfall, Stress prevention, Immune System



Green Spaces for the Second Half of Life

Petra Hagen Hodgson ^[1], Peter Eberhard ^[2]

^[1] ZHAW, Switzerland

^[2] ZHdK, Switzerland

In urban planning today the concept of urban densification prevails, though often at the cost of urban green spaces, especially in housing areas. At the same time, in light of demographic and societal changes with an ageing population, green spaces in the immediate living environment are becoming crucially important to the rising population of the elderly, whose living radius becomes smaller, social integration more difficult and limitations due to health problems more prominent.

Agents responsible for providing housing have at their disposal a variety of models and typologies of housing solutions to offer senior-friendly homes. Yet, too little attention has been paid to the design of green spaces in the immediate living environment focused on the needs and wishes of the growing number of people in their second half of life. There is little scientific research relating to possible beneficial effects that green spaces and gardens could provide for a healthy, self-determined and fulfilling life specifically in older age.

The research project „Green spaces for the second half of life – promotion of quality of life and health through new qualities of green spaces in different living situations of older people in the German part of Switzerland“ addresses these questions and offers solutions.

In this project, seven exemplary residential green spaces in different types of housing (senior living community up to multi-generation cooperative housing), where the garden played a role in the cohabitation of the inhabitants, were analysed and documented. The goal was to formulate advice and guidelines for people who would like to initiate, undertake and operate a garden project themselves and to deliver practical insights to agents responsible for housing.

The main focus of research was directed at the social processes that take place when a garden project is

initiated, planned, designed, installed and operated together in a group and what effects this could have on the physical and psychological health and well-being of the participants. To obtain this information, 28 qualitative semi-structured interviews with inhabitants, i.e. garden users, were conducted, transcribed and evaluated. In addition, interviews with other relevant stakeholders (planners, caretakers, owners etc.) took place. The results were combined with an in-depth analysis of the green spaces themselves (functional, ecological, social, aesthetic aspects).

According to the findings of the project, gardens and green spaces in housing developments - when used and operated jointly and designed accordingly - can play a major role in promoting physical health, psychological well-being and a meaningful organisation of the second half of life. While they are not totally free of social challenges, they do offer possibilities for a better social integration of older people. In order to succeed, such solutions must provide opportunities for a wide range of nature experiences in correspondingly spatially-differentiated green spaces.

The scientific findings led to a substantial publication (special issue of the widespread Swiss design magazine *Hochparterre*) as well as in a « garden box » - consisting of 66 guidelines and 16 worksheets guiding through all steps that are necessary when a group of people initiates, plans, realises, uses and maintains a garden. Both publications are accessible from a newly created website www.alter-grün-raum.ch. In autumn 2017 a printed version of the « garden box » will be published.

Keywords | Green Spaces, Age, Health, Well-being, Densification



What Does it Mean to Young People to be Part of a Care Farm: An Evaluation of a Care Farm Intervention for Young People with Behavioural, Emotional and Social Difficulties

Sarah Hambidge

Bournemouth University, Great Britain

The doctoral study presents the findings of an evaluation to understand the impact of a care farm to improve the mental and social health of disadvantaged children with behavioural, emotional and social difficulties (BESD) from low-socioeconomic backgrounds who are at risk of becoming NEET at sixteen years of age (Not in Employment, Education and Training). It examined the potential underlying mechanisms of a care farm that can enhance young people's chances of remaining in education, employment and training and lead to improvements for this disadvantaged group's health and well-being. The Self-Determination Theory was used as a theoretical framework to explore the underlying psychological mechanisms of experiences of attending the care farm.

This mixed-method study, explored the experiences and perceptions of young people attending the care farm. Data was longitudinally captured using a validated questionnaire pack, semi-structured interviews at baseline, 6 months and nine months, triangulated with observational fieldwork. The RE-AIM (Reach, Effectiveness, Adoption, Implementation, and Maintenance) evaluation framework was used to contextualise these findings. The findings showed the farm was perceived as an inclusive environment which influenced a reduction in self-reported mental health risks (stress, depression and anxiety) and behavioural regulation difficulties; improved social relationships and a sense of belonging and coping; increased contact with nature and the natural environment; improved life and work skills; enhanced environmental mastery; re-engagement with learning; less disaffection with society. There was a change from baseline to the end of the intervention which revealed positive improvements in the young people's total difficulties, hyperactivity and coping skills scores.

The evaluation of the care farm intervention showed it provides an alternative to traditional classroom based learning for the young people with BESD when they were therapeutically supported in a green space. The farm environment was conducive for attending young people to build key social, life and relationship skills, thus enhancing their chances of remaining in education, employment or training.

The study makes several contributions to knowledge. Firstly, the use of the natural environment as the mechanisms for change was found to be effective in reducing the risk of being NEET. The interactions with animals, supportive staff and purposeful activities with a focus on farm skills learning, learning to care for animals, staff and themselves and the encouragement of strong personal development and ambition through re-establishing trust in a variety of relationship contexts, were all key elements for the effectiveness of the intervention. The current evidence base for how to turnaround these young people, particularly those from disadvantaged backgrounds is negligible. The findings of this doctoral study make a unique contribution to this body of work and sheds light on how to care for young people when they are at a very vulnerable state. Further research is needed to inform governmental policies on how to create similar care farm interventions that can make a significant impact on disadvantaged young people's well-being and health. It is anticipated this pilot study will be the foundation to a follow-on study to assess the cost-effectiveness of care farms in improving the mental, physical and social health of disadvantaged children with pre-NE.

Keywords | Care Farms, Self Determination Theory, Disadvantaged young people, Need support, Education, employment and training



Nature Therapy and Green Exercise as Remedies for Emerging Civilization Diseases

Arnulf Hartl ^[1], Johanna Prosegger ^[1], Christina Pichler ^[1], Martin Niedermeier ^[2], Carina Grafetstätter ^[1]

^[1] Paracelsus Medical University Salzburg - Institute of Ecomedicine, Austria

^[2] University of Innsbruck - Institute of Sports Psychology, Austria

In the last few hundred years, there has been an extraordinary disengagement of humans from the natural environment: For the first time in human history, more of the world's population now lives in urban instead of rural areas. The gap in natural exposure between our early evolutionary environments and modern life is growing tremendously. This physical disconnection from the environments in which we evolved has a diametric impact on our health and emotional well-being. A growing amount of health science studies show a significant correlation between increased urbanization and poor physiological and psychological health. Furthermore life satisfaction, well-being and happiness are significantly lower in urban and densely populated areas.

In this way our modern urban societies increase the need for recreation and preference for nature. Outdoor recreation in natural environments is well on the way to becoming an important element of a healthy living and a remedy against the deficiencies of a modern life separated from nature. Nature offers space for activities, observations and learning. It simultaneously provides a

healthy and natural environment for the prevention and treatment of relevant civilization and chronic diseases.

In order to scientifically evaluate the effects of natural environments on human health and well-being, the Institute of Ecomedicine at the Paracelsus Medical University Salzburg pursues the approach of evidence-based medicine: We conduct randomized controlled clinical trials (RCT) for the characterization and evaluation of natural resources like green and white exercise, mountain hiking, waterfall therapy, speleotherapy and balneotherapy. The present talk will present results of our RCTs on the potentials of nature-based interventions for the prevention and therapy of osteoporosis, chronic low back pain and cardiorespiratory fitness. Our data shows that nature and green exercise are effective remedies for these emerging health problems within our urbanized civilization.

Keywords | Green Exercise, Evidence-based medicine, Chronic low back pain, cardiorespiratory fitness, Immune System



Experiences of Psychotherapy Outdoors from a Client Perspective: A qualitative Exploration

Joe Hinds

Canterbury Christ Church University, Great Britain

The present research explored the experiences of outdoor psychotherapy for two female clients. The current body of literature and evidence suggests that unconscious processes and existential concerns are able to explain different aspects of people's experiences outdoors in a range of natural settings. Although a relatively contemporary therapeutic approach, there is a growing interest in therapy conducted outdoors both generally and empirically. However, within this developing corpus of empirical research there is little written about client perspectives, albeit with some notable exceptions. The present research took an existentially informed hermeneutic phenomenological approach to the analysis of the data which was collected through semi-structured interviews. Three overlapping themes were construed from the analysis: Enriched

Environment; Embodiment; Nature as Containment. These themes capture the essence of a dynamic and multi-sensory environment that elicits both a sense of safety and symbolic insight. The physical, embodied dynamism of the encounter is also shown to have important and immediate therapeutic outcomes. Metaphor, in spoken form and perceived in objects in the environment, appear as a thread through all themes as an important process of meaning making. These findings, whilst confined to the experiences of two female participants, highlight the important direction outdoor therapy is taking and how this approach may benefit greenspaces and psychological health care in mutually sustainable ways.

Keywords | Ecotherapy, natural settings, psychotherapy



Effects of Urban Gardening on Symptoms of Chronic Stress: A Hair Cortisol Study

Mathias Hofmann, Christopher Young, Nicole Bauer

Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Switzerland

The lifestyle of many city residents is associated with chronic stress from work and other sources and with exposure to unhealthy living conditions. In the face of a growing world population and increasing urbanization, it is becoming increasingly important that the urban living conditions are improved. Although the positive effects of urban nature on human health have been documented previously, urban open spaces are under continuous pressure to be used for other purposes, such as residential construction, commercial uses, or traffic areas. Research on measurable health benefits from urban green may thus produce arguments for greener cities. The health and psychological benefits from urban nature are hypothesized to come about via different, interlinked pathways. Hartig et al. (2014) proposed four such mechanisms: air quality, physical activity, social cohesion, and psychological restoration from stress. Different activities are associated with different combinations of these mechanisms, with gardening being one that allows for all of them. Hence, comparisons of gardening activities with different other recreational activities may indicate the relative importance of the single mechanisms.

The study subjects (n = 130) were non-gardeners and gardeners from two large Swiss cities. They were recruited via waiting lists for allotment gardens. This way of assigning the subjects to the two groups allowed for a quasi-experimental design. At two points in time,

before and after the gardening season 2016, hair samples were taken from each subject, to measure chronic stress. At each of these time points, the subjects also completed a questionnaire to assess leisure activities and demographic details. The questionnaire also contained standardized scales to measure prevalent stressors (SSCS; Schulz et al., 2004), observed stress symptoms (SCI; Satow, 2012), the current state of health (SF-12; Morfeld et al., 2011) and current subjective wellbeing (ASTS; Dalbert, 1992).

The data indicates a considerable stress-reduction effect of gardening activities: As expected, the stressors prevalent in the subjects' life explain only a part of the perceived stress symptoms. More of this variance can be explained when for example taking into account the time spent in a garden and the subjective appraisal of the available personal income. On their own, these factors have only limited predictive power, but in interaction they can be used to explain more of the variance. Results from the questionnaire data will be presented, as well as the results of the cortisol analyses. The role of physical activity, social cohesion, psychological restoration, and demographic factors will be discussed.

Keywords | Urban green, allotment gardens, health, stress

References:

- Dalbert, C., 1992. Aktuelle Stimmungsskala (ASTS). Tübingen: Universität Tübingen, Abteilung Pädagogische Psychologie.
Morfeld, M., Kirchberger, I. & Bullinger, M., 2011. Fragebogen zum Gesundheitszustand: SF-36. Göttingen: Hogrefe.
Satow, L., 2012. Stress- und Coping-Inventar (SCI): Test- und Skaldokumentation., URL: <http://www.drsatow.de/tests/stress-und-coping-inventar.html>
Schulz, P., Schlotz, W. & Becker, P., 2004. TICS: Trierer Inventar zum Chronischen Stress. Göttingen: Hogrefe.



Reloading Your Batteries - a Cross-over-experiment on Restoration, Cognitive Performance and Health of Adolescents

Hans-Peter Hutter^[1], Renate Eder^[2], Brigitte Alex^[2], Arne Arnberger^[2], Marie Jansson^[3], Peter Tappler^[3], Lilly Damm^[1], Michael Kundi^[1], Peter Wallner^[1]

^[1] Medical University Vienna, Austria

^[2] BOKU - University of Natural Resources and Life Sciences Vienna, Austria

^[3] Austrian Institute for Ecological Buildings, Austria

Background

School life challenges pupils' wellbeing as well as cognitive skills. The need for recreational breaks during school hours has since long been recognized. However, the environmental conditions during breaks that provide the best opportunity to prevent from deterioration of performance and well-being have received little attention so far. Positive effects of green spaces on well-being indicate that natural environments could be of particular relevance. However, effects of natural environments in adolescents have been investigated scarcely.

Within a multidisciplinary approach this study investigated effects of different urban environments and green spaces on wellbeing, cognitive performance, and cardiorespiratory function of adolescents, funded by "Sparkling Science". In this paper we mainly report about medical investigations.

Methods and material

Healthy pupils (n=64; 16-18y) of 3 schools in Vienna volunteered in a cross-over experiment. Students visited 3 different settings (a small park in urban area, large park, forest) for 1 hour during lunch break.

Well-being was assessed by a Nitsch self-condition scale. With this standardized questionnaire, the subjects characterize their actual state by 19 attributes (6-step-scale, "does not apply at all – applies fully) which map motivation and strain. The items belong to 6 dimensions: readiness for action, readiness for exertion, alertness, state of mood, tension/relaxation, and recuperation. Cognitive performance was assessed by the d2 Test of Attention. Furthermore, the Perceived Restorativeness Scale was applied.

Effects on the cardiorespiratory system were investigated by measurements with peak flow meter and pulse oximeters. Levels of carbon dioxide as indoor air indicator were determined by standardized measurement procedures.

Results

In total, data from 60 students were available. On the 3 days of measurement, the participants' wellbeing

measures did not differ significantly at the beginning of the lunch break. Well-being (esp. readiness for exertion, alertness, recuperation) was higher in all outdoor settings. However, a sustained effect was only found for the near-natural setting of a stay in the forest. Results of the d2 test revealed a significant improvement of cognitive performance after the visit in all locations with best scores in the large park setting. Overall, pupils were rather satisfied with their stays at the study sites. Forests received highest satisfaction scores, while small urban parks scored lowest. However, a stay in a larger park often received the same scores as a stay in a forest.

We could not observe any relevant differences between the 3 settings concerning peak expiratory flow and oxygen saturation. CO₂ concentrations ranged between 400 ppm and 3,600 ppm.

Discussion

Previous studies have suggested positive effects of green spaces on diverse health indicators. We found such an effect of nature on adolescents' wellbeing, in the sense of recovery from negative mood, improved readiness to act and recreation. Such positive effects are important regarding challenges of every day school life. Additionally, it was demonstrated that adolescents' cognitive performance improved significantly after exposure to all 3 different settings. CO₂ air quality standard of 1000 ppm was exceeded in most cases. As increased CO₂ levels are associated with decreased cognitive performance in school children this issue seeks more attention.

Conclusion

Our findings suggest that restoration and improvement of cognitive performance of adolescents depend on the type of green spaces. These positive effects of restoration during school time should be used more. There is thus a need for school planning to match the restoration needs of school children.

Keywords | Adolescents, Cognitive performance, Green spaces, School, Well-being



Sport and Fitness Running in Polish State Forest - Case Study

Emilia Janeczko, Małgorzata Woźnicka, Doro Kargul-Plewa, Wiesława Nowacka

Warsaw University of Life Sciences, Faculty of Forestry, Department of Forest Utilization, Poland

In recent years in Poland we can observe an increasing interest in running as a form of sports activity, but also as a recreation. Forests and other green areas, both in and outside cities are the most suitable place for practicing running. Particularly, the forests in the vicinity of large cities seem to be attractive for practicing this kind of sport. The article presents the results of a research which aim was to determine the public interest in sport and recreation running in the forests. This required on the one hand, to recognize the scale of running in the forest areas (e.g. a number of sport events, attendance of participants), on the other hand to determine the social preference for the running in forests. Therefore, the article presents a comparative analysis on the development of running in the forests in the vicinity of two big Polish agglomerations: Warsaw and the Tri-City (Gdańsk-Gdynia-Sopot). For this purpose, statistical data was analysed from the period between 2010 and 2016, obtained from the Regional Directorate of State Forests in Gdansk and Warsaw, in relation to the number of sport events carried out within the state forest, the nature of the events (e.g. orienteering, cross-country, trekking etc.), the users' profile (children, adolescents, adults) and the attendance of participants. Simultaneously with the statistical analysis an online survey was conducted among people running in the forests. The on-line questionnaire was sent through social media to different discussion groups, bringing together the enthusiasts of running. The survey included questions

about the frequency and time of running in the forests, factors determining the attractiveness of the forest as a place to run and the questions regarding the participation of respondents in running sport events organized in forest areas. The survey involved a total of 346 users of forests.

The results indicate a steady increase in the number of participants in cross-country sports events organized in the forests. The results pointed also that among the respondents fairly large group are recreational runners. They occasionally run in the forests and do not often participate in organized sports events. The largest group of people running in the forests are men, aged 35-44, running alone 2-3 times a week, with long experience in running (over 4 year) and the average weekly training mileage of up to 10 km. Forests are an attractive place to run mainly because of the contact with nature, landscape, clean air and a friendly surface. Among the most frequently mentioned shortcomings of running in the forests were: lack of lit and marked trails, fear of ticks. The vast majority of respondents believed that forests are suitable for organizing running events. The results may be useful in land use recreational forests in the vicinity of urban areas and in the planning of recreational infrastructure in forest areas.

Keywords | forest recreation management, sport facilities, forest recreation



Exploring the Wellbeing Effect of Protected Areas - An Intercultural Comparison

Alexandra Jiricka-Pürner^[1], Valeria Tadini^[2], Andrzej Tucki^[3], Boris Salak^[1], Giulio Senes^[4]

^[1] Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences Vienna, Austria

^[2] Università di Milano, Italy

^[3] Maria Curie-Skłodowska University (UMCS), Poland

^[4] Università di Milano, Italy

While a lot of studies examined green structures in urban environments and their impact on physical well-being and activity in peoples' daily life (Cohen et al. 2007, Frumkin et al. 2004, Humpel et al. 2002, Lee and Maheswaran 2010, Mc Cormack et al. 2003, Powell 2005) some others revealed landscape preferences related to activities outside city areas (Baur and Gilgen 1999; Gasser and Kaufmann-Hayoz 2004; Lamprecht and Stamm 2002 and Marti et al. 2002). Studies such as Özgüner and Kendle (2006) and Payne et al. (2002) dealt with preferences of designed and easily accessible landscapes/parks versus more wild and near-nature settings. Due to their valuable landscape and natural characteristics PA distinct themselves from other green spaces. Thomson et al. (2014) mention the specific value of PA as resources for public health and describe management actions to increase this potential. Whereas profound knowledge has been gained about preferred activities in PA and visitor motives, studies are very limited, which survey the capacity to benefit to health and wellbeing attributed to PA explicitly by their visitors. The importance of PA for societal health could emphasize the necessity to preserve them, however. The concept of ecosystem services reinforces the role and importance of PA in the context of health and wellbeing. This is in particular relevant in countries where PA do not have a high reputation since their origination are less well known for their values. Several studies have surveyed the perception of green areas according to the visitor's background such as Kaspar and Bühler (2006), Maas et al. (2006), Lee et al. (2001), Payne et al. (2002), Grahn and Stigisdotter (2003) and Wilbur et al. (2002). In addition, studies about cross-country comparison of nature based activities such as Landauer et al. (2012) showed strong cultural differences with regard to the importance of wild nature and landscape preferences.

So far, however, the perception of PA as a resource for personal wellbeing and health has not been examined in a cross-country comparison. Thus this presentation, evolving from an international COST-network on the impact of ecosystem services on health and wellbeing, will compare three cultural backgrounds (Mediterranean, Central European and Eastern European) in order to identify possible differences in the attitude towards PA and their capacity to contribute to health and wellbeing. An extensive survey with face-to-face questionnaires was conducted between 2014 and 2016 in three types of PA in each country – Poland, Austria and Italy, which resulted in an overall sample size of 1390 people. Both impacts on emotional and physical personal wellbeing in context with a stay in a PA were examined.

Not only with regard to visitor motives but also regarding health benefits associated with a stay in the PA strongly significant differences were visible between the three countries Austria, Italy and Poland. Similarly the importance of PA for personal wellbeing is considered in a diverse way in the three countries. Furthermore the activities carried out in case of good or bad health conditions vary between the countries and therewith the likelihood to go to a PA in order to improve the personal wellbeing. These results confirm that the strategies, to highlight the importance of PA and create awareness of their beneficial effects on health and wellbeing of the population, vary in a transnational context. Consequently management strategies but in particular international guidance documents need to reflect these culture specific differences.

Keywords | Protected areas, Intercultural, Mental health, Emotional health, Physical health



Shaping the Forests with Regard to Human Health. Concepts from the Beginning of the 20th Century Compared to Recent Developments

Elisabeth Johann

Austrian Forest Association, Austria

In the second half of the 19th century the increase of industrialization moved people from the countryside into rapidly expanding towns. It turned labour into a disciplined and mainly indoor activity and brought pollution and urban squalor. By those means they became separated from their former traditional way of living and lost the close relationship to nature. This alienation determined a remarkable social change resulting also in a change of human behaviour towards nature.

The "return to nature" as proclaimed in art became apparent also in the spirit of the whole period and in the conduct of life. When the impact on human health caused by industrial emissions such as smoke and noise increased, an extensive stay in the open landscape was considered necessary as beneficial for body and spirit. Because of its extent, its nature and its influence on the shape of the landscape, surface forests were suited best to cover the society's need for recreation. Thus, the question of responsibility related to the protection and conservation of forests was put up for discussion among foresters.

The paper addresses the question what measures were implemented in order to meet the needs of the society in terms of human health. In the 1880ies the aesthetic aspects of forestry were introduced as an independent topic into literature by Salisch and Guttenberg. Forest scientists as well as managers such as König, Grebe, Kozesnik and others wanted to consider the forest not only as an economic property, cultivated to produce a certain yield, but also as a source of pure enjoyment. In 1907, on occasion of the International Agricultural Congress in Vienna, Dimitz and Conwentz

proposed a bundle of silvicultural measures which could be taken up by forest management in order to comply with the social requests and were comprised in the term "aesthetics of forestry". They extended the term conservation of natural monuments in its originally narrow meaning to explicit cases of landscape protection, such as recreation forests and forests with beneficial values, particularly in the vicinity of big cities, holiday resorts and spas. The law concerning the design of a woodland and meadow belt around Vienna for the well-being of its 2 Million inhabitants, which was approved by the Viennese municipal council in 1905, causing a sensation in the international public opinion in those days, is only one example among others. Thereby clean air and recreation areas of a substantial extent were provided to sustain people's health.

Today, there are a number of collaborations between forest research institutions and medical universities in the field of human health. Thereby particular attention is paid to the effects of differently shaped landscapes as well as also to the type of stay in the open air. These include recommendations on the shaping of recreational forests, which are characterized by particular aesthetic stimuli. Based on the comparison of concepts from the beginning of the 20th century with the present status of knowledge related to the optimal health benefits, the study wants to stimulate measures which could be taken up and implemented in the field of forestry of these days.

Keywords | Recreation, human health, forest management, aesthetic principles, landscape protection



To Tree or Not to Tree: People's Psychophysiological Responses to the Urban Landscape

Andy Kaufman ^[1], Arthi Padmanabhan ^[1], Paul Bolls ^[2], SangMi Lee ^[3], Roxanne Adams ^[1]

^[1] University of Hawaii, USA

^[2] Texas Tech University, USA

^[3] Dankook University, People's Republic of Korea

The objective of this study was to assess people's preference and physiological responses to vegetation, and lack of vegetation in urban environments. By identifying and understanding people's psychophysiological responses to trees and vegetation, and lack of these natural amenities in urban areas within two distinct environmental and demographic urban regions of the U.S., development of specific recommendations of the importance of trees and vegetation within urban environments can be implemented. Data was collected in Hawaii and Missouri urban environments of landscapes without significant vegetative landscaping in both affluent and economically depressed demographics. Respondents (n=99) viewed 28 scenes of exiting urban environments lacking vegetation and then the same environment with significant vegetative landscaping. While viewing images, respondent's psychophysiological responses including heart rate (EKG), galvanic skin conductance response (GSR), and facial muscle activity (EMG) and (EEG) electroencephalograph were measured in real time. Data revealed that respondent's physiological measurements varied when viewing urban environments with landscape vegetation and those without landscape vegetation. Specifically, significant data resulted in terms of information processing, as shown in ECG and EMG analysis. These psychophysiological measurements revealed there was information rejection for negative stimulus viewing (non-landscaped images), as well as increased activation in positive arousal states from landscaped images. These observable effects of

landscaping of a visual scene (presented in pictures in this study) on ECG, heart rate, a psychophysiological indicator of attention and facial EMG recordings, a psychophysiological indicator of positive or negative emotional response were quite interesting. Essentially, landscaped scenes (both in Hawaii and Missouri) elicited more emotional arousal than when compared to the images of the non-landscaped scenes. This pattern appears to be independent of geographic location (Hawaii and Missouri in this study); and the comparison of both datasets indicated a significant landscape x location x time interaction in the data collected in Hawaii. Moreover, in evaluating the heart rate responses and seeing a strong increase in value changes (degree of activation and orientation) with significant results, compared to baseline activity for non-landscaped scenes, reveals very interesting insights to the way people are processing the limited amenities within these urban forest environments. Since measuring heart rate is a physiological indicator of attention, this data is revealing that respondents were expending more or less attention processes given which landscape they were being exposed too. These results may assist policy makers, green industry representatives, designers, and educators in providing specific information to help create green and sustainable urban landscape structure.

Keywords | Urban forest, Psychophysiology, Urban Landscape, Trees



Re-vitalising Urban Waterfronts

Thomas Kistemann

GeoHealthCentre, Institute for Hygiene and Public Health, University of Bonn, Germany

While much research has been addressing the salutogenic potential of green urban spaces during the last decades, blue urban spaces, i.e. urban superficial water bodies, have mostly been subsumed as part of open spaces, or even completely neglected to this effect for a long time. Only recently interest in health-enhancing effects of the so-called (urban) blue spaces is emerging (White et al. 2010, Völker & Kistemann 2011, Foley & Kistemann 2015). This coincides with the continuing global phenomenon of waterfront revitalisation (Hoyle 2000): Many of the world's most innovative real estate developments have taken place at waterfronts. In cities such as London, Rotterdam, Hamburg and Barcelona in Europe; Boston, Baltimore, San Francisco, Vancouver and Toronto in North America; and Sydney, Brisbane, Melbourne, Singapore and Osaka along the Pacific Rim, waterfronts have become favoured new retail, leisure and entertainment destinations.

Against the background of the increasing amount of urban population worldwide, associated with emerging health challenges, as diverse as thermal stress, noise, air and water pollution, traffic accidents, stress and overcrowding, uprooting and social disruption, mental disorder, obesity and lack of physical activity, it seems to be worthwhile to explore whether, how and to what

extent, specific urban blue spaces such as redeveloped waterfronts may have the potential to contribute to mitigating health impacts of urban life, prevent risk factors and disease, and even improve health of urban dwellers.

By a systematic literature review which is based on relevant data bases (Web of Science, ScienceDirect, Pub Med) this paper seeks to outline current knowledge concerning health benefits which may be gained specifically through revitalisation of relinquished urban port sites, and to investigate whether health has been recognised as an issue within the discourses around revitalisation of such blue spaces. Preliminary results indicate that so far planners and stakeholders have only rudimentarily discovered and exploited health as an argument for their urban waterfront redevelopment projects. Comprehensive and steady strategies in the sense of "good urban blue governance for health" (Baumeister 2016) seem to be essential to adequately implement and maintain health on the agenda of waterfront redevelopers.

Keywords | blue space, urban health, therapeutic landscape

References

- Baumeister, H. (2016): Blue Governance – chances for health-promoting urban development. Bielefeld (in German).
 Foley R, Kistemann T (2015): Blue space geographies: Enabling health in place. In: *Health and Place* 35: 157-165.
 Hoyle, B.S. (2000): Global and Local Change on the Port-City Waterfront. In: *Geographical Review*, Vol. 90 (3), 395-417.
 Völker, S.; Kistemann, T. (2011): The impact of blue space on human health and well-being – Saluto-genetic health effects of inland surface waters: A review. In: *International Journal of Hygiene and Environmental Health* 214 (6), 449-460.
 White, M.; Smith, A.; Humphries, K.; Pahl, S.; Snelling, D.; Depledge, M. (2010): Blue space: The importance of water for preference, affect, and restorativeness ratings of natural and built scenes. In: *Journal of Environmental Psychology* 30, 482-493.



Nature Heals: People, Plants, Animals and the (Re-)connection to Health

Jean Larson

University of Minnesota, USA

The University of Minnesota has been home to the Nature-Based Therapeutic (NBT) Services for the past 25 years. The NBT services are a marriage between academics and community-engagement. It is a collaboration between the University of Minnesota's Integrative Medicine and Botanical Garden.

The NBT vision is to revolutionize the health and wellbeing of people and planet. A mission to be a global resource to academics, practitioners and stakeholders.

Our work operates on the following principles:

- The relationship between humans and Nature (plants to animals) are essential to the health and well-being of all people.
- All people can benefit from nature by way of knowledge and understanding.
- Research is critical to discovering new knowledge about the relationship between humans and Nature.
- Education and dissemination of Nature-Based Therapeutic information is an essential activity and includes: model programs, replicable research studies, demonstrations, displays, written, visual and verbal delivery.
- Obtaining regular feedback from users and stakeholders will improve the Nature-Based Therapeutic experience and the overall success of the services.
- To advance the field of Nature-Based Therapeutics, it is our commitment to provide exemplary, innovative, rigorous and evidence-based research, programs, events, information, interpretation and resources.

Our goals include:

1. Lead in the worldwide best-practice of nature-based therapeutic methods and techniques
2. Educate in theory and application of nature-based therapeutic modalities
3. Build a foundation of rigorous and relevant research in Nature-Based Therapeutics
4. Provide state, national and international community outreach and public engagement in Nature-Based Therapeutic topics and policy

This presentation will provide an overview of the rationale for NBT over the arch of 25 years' time along with evidence pertaining to impacts it has made to human health and wellbeing. Highlights include: Program Services for over 30,000 people with varying abilities. Training for professional handlers in Animal Assisted Interventions and Therapeutic Horticulture. Academic courses in therapeutic horticulture, restorative environments, and other nature-based modalities. Research into the healing benefits of nature on campus and within the community. Outreach through international keynote presentations, lectures, conferences, roundtables and events.

Keywords | integrative medicine, nature-based therapeutics, wellbeing



Application of Horticultural Therapy in Poland: Experiences and Prospects of its Development

Monika Latkowska^[1], Lidia Poniży^[2]

^[1]Warsaw University of Life Sciences, Poland

^[2]Adam Mickiewicz University, Poland

Horticultural therapy is a form of occupational therapy based on contact with nature and horticultural/agricultural activities as means used for the improvement of human health and life quality. It can be used for various groups of disadvantaged users: people with mental, psychiatric, physical and cognitive disabilities, addicted to psychoactive substances, unemployed, homeless or prisoners. In many European countries horticultural therapy is used as a support for the therapy and rehabilitation in hospitals, health care centres, therapeutic gardens, social care centres, vocational therapy workshops, correction centres, prisons, centres for addicted people and 'green care' farms. Passive and active contact with both plants and other users may improve physical, mental and emotional state of disadvantaged people, as well as their social functioning.

Horticultural activities have been offered for many years in Poland by the occupational therapy and vocational activity workshops, social care houses, centres for drug and alcohol addicts. There are also some 'green care' centres located in the countryside, where gardening and farming are used for therapeutic purposes.

The first study on the status of horticultural therapy in Poland was carried out by the author of the paper in 2010-2011. Since that time growing interest in its application was observed, and the number of places offering different forms of 'green care' for various users' groups has increased. Significant attention is paid nowadays to the therapeutic and social functions, which contact with plants and gardens may play in human life, especially for disabled, chronically ill and elderly people.

The aim of the paper was to present the diversity of forms and applications of horticultural therapy in Poland. A descriptive method of the case study was used in the research. Data was collected by means of interviews carried out with the staff of the selected centres engaged in horticultural therapy (this selection was made on the basis of the information available on their web pages and obtained via direct contacts).

Paper presents application of horticultural therapy in: hospitals (Szpital im. Św. Ludwika, Kraków; Centrum Zdrowia Dziecka), 'green care' centres (Osada Burego Misia; Farma Życia; Projekt Wiejski „Ludzie ludziom”), therapeutic garden for the visually impaired (Park Orientacji Przestrzennej, Owińska) and social care centres (Zakład Pielęgnacyjno-Opiekuńczy, Toruń; Dom Pomocy Społecznej, Bramki).

These examples enabled us to draw conclusions about the diversity of forms of horticultural therapy used in various medical and social care centres in Poland, similarities and differences observed between Polish and foreign experiences, as well as their future prospects and directions of the development. One of the most important issues, significantly influencing further development of horticultural therapy in Poland, is its incorporation into the official therapy methods and financial support provided by the national health care system.

Keywords | green care, disadvantaged, disabled



Gabriels Garten: Experiences as a Nature Coach in Working with Asylum Seekers

Nadja Lobner

Gabriels Garten, Austria

Statement of the Problem

As a political scientist, who worked in the interdisciplinary field of poverty research, I was spending a lot of time with asylum seekers. It became obvious, that waiting for the decision about their recognition as refugees was a very stressful situation for them. They were afraid of deportation, suffered from the consequences of violence and exploitation, they had very little support to cope with post-traumatic stress syndrome and they were excluded from society for different reasons. Therefore I was looking for possibilities to offer asylum seekers ways to strengthen their resilience, to build up friendships, and to start to love life, although their recent living conditions were horrible. They were the opposite of whatever could be recommended for supporting human beings to recover from post-traumatic stress syndrome.

Description of Methods and Approaches

Inspired by the conference "Green Care and Garden Therapy" at the Hochschule für Agrar- und Umweltpädagogik in 2013, I decided to found a "nature coaching"-project for asylum seekers in Salzburg. I attended a course at the Rural Institute For Further Training (Ländliches Fortbildungsinstitut) in 2014 to receive a diploma as a so-called "Nature Coach". Nature Coaching is a helping and supporting process within and with the aid of nature and natural landscapes, which positively influences on quality of life and sustainably improves human's individual development. Nature Coaching means, that nature is the coach and humans are the coachees. The job of the nature coach is to interfere between nature and the coachees.

Already in 2014 "Gabriels Garten" offered asylum seekers to participate at excursions to the woods and river banks in Salzburg's surroundings and to attend German language conversational trainings in community gardens. For this work I got a lot of support from my life mate. In 2015 and 2016 we founded a vegetable garden

directly in an asylum seeker's hostel. The garden was also used as a place to meet for language training, doing homework for the regular German courses, studying for the secondary school exam and meeting for educational dialogue about human rights and democracy.

Major Results

All the asylum seekers, who participated in these nature coaching projects regularly, raised their awareness for their health and well-being. They understood the importance of having regularly joyful moments in nature to cope with post traumatic stress. By doing this, they were successful in concentrating on their integration process. None of the participants tried to solve any problem or conflict with violence against others or against themselves. They became aware for the health problems of other asylum seekers, e.g. addictions. Landscapes and the community gardens became a space where the asylum seekers understand and trust each other, telling each other about the own suffering, listening to each other and letting go of negative emotions. Some of the asylum seekers said, that small-scaled gardening for them is associated with poverty. Speaking about poverty led to dialogue about gender roles in labour, global problems like land grabbing or ecological crisis.

Conclusion Statement

From the experience of the participants it seems that nature coaching can have a healing impact for the suffering individual human being and for relationships between humans. As experienced violence becomes visible in the human relationship to plants and animals, nature coaching with fringe groups like asylum seekers has to be combined with dialogue about trauma, human rights and democracy.

Keywords | nature coaching, social inclusion, asylum seekers, trauma, human rights



Enhancing the Social Dimension of Sustainable Forest Management in the Context of the Benefits of Forests to Human Health and Well-being

Ludmila Marusakova, Igor Viszlai

FOREST EUROPE, Liaison Unit Bratislava, Slovakia

Scientific evidence exists which probes that exposure to forests has a significant impact on human health. Forests are a unique place for leisure activities, restoration, recovery from stress and further social and therapeutic interventions and forest environment has positive effects on physical and psychological health. Forests provide an ideal venue for recreation, sport, tourism, but also education to sustainable development, as being in nature stimulates emotional wellbeing, support responsibility and empathy. Rational management of forests, so called Sustainable Forest Management (SFM), secures that forests provide such services continuously. Promotion of social aspects of SFM, impacts and benefits of forests on human health and well-being could lead to increasing entrepreneurship and green jobs based on forest related services, wood and non-wood products with positive effect on quality of life.

For enhancing the social dimension of SFM, the ministers responsible for forests adopted at the Vienna Ministerial Conference on Protection of forests in Europe in 2003, the Vienna Resolution 3 „*Preserving and Enhancing the Social and Cultural Dimensions of Sustainable Forest Management in Europe.*” The FOREST EUROPE signatories committed themselves, inter alia, to maintain and further develop both the material (e.g. wood in architecture, medicinal plants) and the non-material (e.g. recreation, well-being, health) social and cultural aspects and benefits of SFM. To highlight the importance of this topic for FOREST EUROPE process, in 2015, the ministers responsible for forests in the Madrid Resolution 1 „*Forest sector in the center of Green Economy*”, acknowledged that forests are a source of employment with great potential to generate jobs and income opportunities also through new forest products and services as well as to contribute to rural development, human well-being and social equity,

enabling also the long term economic viability and competitiveness of forestry and forest-based industries by serving as a sound basis for bioeconomy.

Within the FOREST EUROPE Work Programme for 2016-2020, building on former initiatives and ongoing work and experience in signatory countries, FOREST EUROPE seeks ways to strengthen the social aspects of sustainability with particular emphasis on the benefits and impacts of forests and forest products on quality of life and well-being. To fulfil this aims, FOREST EUROPE established an expert group with the aim to conduct a review of international research data on related aspects. For promotion of social aspects of SFM in the context of benefits of forest environment and forest products on human well-being, a workshop will be convened to enable sharing of knowledge, experience and best practice examples. Conclusions and recommendations of the expert group as well as workshop participants representing FOREST EUROPE signatory countries and observer organisations will lead to promotion of the green jobs and rural entrepreneurship in the forest sector.

The expected results of these activities will contribute to raising awareness of the topic. Moreover, the outputs will serve as an information tool for decision makers and assist forest owners and forest managers to increase entrepreneurship and provide services leading to the green jobs in the forest sector. As FOREST EUROPE is a high-level political forum with pan-European scope, outputs of the action will approach a wide audience, the policy makers, national authorities as well as practitioners in its 46 signatory countries as well as the general public.

Keywords | forests and human health, benefits and impacts of forests, sustainable forest management, social aspects, green jobs



Requirements on Landscape and Agriculture

Maria Meinert

Rheinische Friedrich-Wilhelms-Universität Bonn, Institute for Food and Resource Economics, Germany

Problem

With regard to landscape design and the use of landscape, growing agricultural-induced annoyances and conflicts of use between farmers and non-farmers are observed during the last years. For non-farmers, landscape has a high value for their well-being and recreation. From their point of view, the use of landscape by farmers can be regarded as disturbing factor and an intervention in nature. Citizens criticize the landscape-design by farmers.

Methods

In a multi-stage triangulation study, different levels were considered. Among other things, attention has been paid on how citizens perceive and assess the local landscape and which meaning they assign to the landscape. Concrete requirements and assignments of tasks concerning the design of the local landscape were determined.

In 14 different villages in Germany interviews with their citizen were conducted (n=3.117) to gain information about their point of view on the design of the local landscape. For the statistical verification of significant correlations of variables, the Chi-square test was done. Additionally, the correlation or association measure Cramers-V was determined. Furthermore, various qualitative interviews (expert, problem-centered, focused and episodic interviews, n = 46) as well as discussion rounds (n = 4) were conducted. The coding, processing and analysis were done by using software for computer-assisted qualitative data and text analysis (Maxqda) according to the principles of hermeneutics.

Major results

Citizens like to spend their free time in the countryside to escape the daily stress. In times of higher stress due to working, leisure time becomes more important. The inhabitants use the landscape for different activities: for walks, sport-activities and hobbies. On average, almost 90% of the respondents say that they find relaxation and recreation in nature. The landscape supports the

physical and mental well-being of the inhabitants. Interviewees describe, that they find peace in nature. When using the landscape, people's senses are strongly addressed. It becomes clear that the respondents appreciate the local landscape because of the tranquillity and natural noises, such as bird chirping. Furthermore people appreciate the local landscape because of its variety, beauty and naturalness: The design of the landscape is of great importance for the citizens. The equipment of landscape with hedges, shrubs and trees contributes to the fact that the respondents feel welcome in the local landscape. Monotone landscapes (for example landscapes with too much cultivation of corn) and landscapes, whose natural scenery is disturbed for example by wind turbines, are criticized by non-farmers.

The use and design of the landscape by farmers is perceived and criticized by some respondents as disturbance. Farmers are confronted with claims about a landscape that are difficult to arrange with the economic management of their farms. Particularly in intensive agricultural regions, farmers can not satisfy all requirements of non-farmers. Despite partial criticism of the landscape-design, citizens want an unchanged landscape – mostly independent from the (negative) perception of the landscape. The predominant desire is familiarity and reluctance to changes.

Conclusion statement

The results show, that the design of the landscape is of great importance for citizens and their sense of recreation and relaxation. With regard to landscape management, landscape conservation and environmental protection, farmers – especially in intensive agricultural regions – cannot meet all requirements about landscape-design of non-farmers. To ensure the acceptance of the local inhabitants, farmers must take these requirements and desires of non-farmers into account.

Keywords | Landscape-design, agriculture, requirements, agricultural-induced annoyances



Psychological and Physical Effects of Walking through a German Mixed Stand Forest

Katharina Meyer^[1], Stefan Hey^[2], Renate Bürger-Arndt^[1]

^[1] University of Göttingen, Forest faculty, Chair of Nature Conservation and Landscape Management, Germany

^[2] Karlsruher Institut für Technologie, Germany

Introduction

The number of studies concerning the health benefits of forests has been growing, particularly in the Asian countries since the beginning of the 21st century. Several, mainly Japanese studies provide evidence that forest exposures have stress reducing effects and forest bathing has become a popular leisure time activity in Japan. Although, the Germans have a strong connection to their forests due to their history, there are only few investigations on forest health benefits. The question raises whether Japanese findings on the stress reducing benefits of Japanese forests can also be revealed from a study in Germany. To verify whether there could be a similar result on German studies, this pilot study has been designed analogue to the design of some Japanese studies (PARK et al., 2010, 2011; TSUNETSUGU, 2007) in which test persons had walked through a forest and an urban environment while physical and psychological parameters were collected.

Method

Therefore, 18 male test persons, between 19 and 69 years, walked voluntarily for 20 minutes through a German mixed stand forest close to Göttingen (Germany, Lower Saxony) and through an urban environment close to Göttingen's city centre. Immediately before and after each walk the test persons performed a self-evaluation of their present mood state according to the German Profile of Mood States (POMS) version. POMS is a psychological test which results provide information about the mental well-being of the test persons. The physical well-being of the test persons was measured during their walk. While walking, both the heart rate variability (HRV) parameters HF and LF/HF and the number of skin conductance responses (SCR) of the electrodermal activity (EDA) of the test persons were determined. Both parameters provide information about the current stress level of the test person. While the parasympathetic activity was

derived from HF, the relation between LF and HF was interpreted as an indicator for sympathetic activity. As the HRV varies with the age of a person, the sample size was taken from two groups: students and other.

Major results

Significantly better POMS values of subscales depression (Niedergeschlagenheit) and displeasure (Missmut) were achieved after the forest walk compared to the POMS values taken before the forest walk. The POMS analysis revealed furthermore that the values on all four POMS subscales (depression, fatigue, vigour and displeasure) taken before both, the forest and the urban walk, were significantly better before the forest walk. Besides, the parasympathetic activity in the student group was at the end of the forest walk higher than at the beginning. Compared to the urban walk, the student's parasympathetic activity (HF of HRV) showed partly significant higher values during the forest walk. During the forest walk, the test persons' number of skin conductance responses (SCR count) were lower than during the urban walk, except for one minute. Both parameters, HF of HRV and SCR count of EDA indicated a decreased stress level.

Conclusion

The psychological measurements showed better mood states of the test persons after the forest but not after the urban walk. The physical findings indicated a stress reducing effect of the forest walk. The obtained findings imply that German forest mixed stands could have similar effects on health like the Japanese forests. It was assumed that there is no cultural difference between German and Japanese recreational demands.

Keywords | Forest health benefits, Profile of Mood States (POMS), heart rate variability (HRV), electrodermal activity (EDA)



Design of Playgrounds for Children with Intellectual Disability: Case Study Based on Preference Observation

Tamara Muic, Mihailo Grbic, Dragana Skocajic, Andreja Tutundzic

Faculty of Forestry, Serbia

The purpose of this research was to study design recommendations for playgrounds for children with intellectual disability. The research method involved observation in order to collect data on the behaviour of children with mild (IQ: 50-69) and moderate (IQ: 35-49) intellectual disability. Two groups, formed on the basis of the intellectual disability levels, comprised 10 children, aged from 7-11 years. Over a period of 4 weeks (2 weeks for each group), an analysis of their behaviour and preferred games was made by observing them at two characteristically different locations: a location familiar to the children – the “Kolevka” foster home in Subotica, and a location which was unfamiliar to them – Prozivka Park, also in Subotica. Checklists, based on the survey “The Healing Landscape” (Tyson, 1998) and the observation maps Behavioural Observation (Brad, 2002) were filled in for every child. Afterwards, the obtained data was processed by analysis of variance (ANOVA) using Statgraphics Centurion software package ver. XVI.

Comparing the results of children's behaviour between the groups, and the behaviour of each group at different locations, the analysis showed that, in both groups, teachers have to initiate games for the development of social skills. This is especially important in the case of the group with moderate intellectual

disability, and is dominated by single player games, but it is possible to develop social skills to a level where playing in a group is achievable. In addition, the results indicate that it is necessary to initiate games that lead the children through a space, teaching them orientation, a particular problem at the unknown location, and give emphasis to creative games that encourage mental development. Design recommendations implements guidelines to develop maximum mental abilities, in accordance with the preferences and social skills of the children, leading to the creation of a model of activities. Based on the collected data, design guidelines were suggested and presented in the form of preferred activities for each group. They indicate the appropriate type and intensity of physical activity, as well as the attitude to the environmental conditions within each group, which is very important for the landscape design of the playgrounds.

Regarding to observation of children's preferences, design recommendations were shown as model of activities appropriate for each group, through design of the playground for children with mild and moderate intellectual disability.

Keywords | Intellectual disability, design recommendations, observation



The Green Urban Cemetery as a Public Health Resource

Helena Nordh, Katinka Evensen

Faculty of Landscape and Society, Norwegian University of Life Sciences, Norway

Green spaces are highly important to urban inhabitants. They not only provide access to the outdoors, but are places to meet with neighbours and friends, as well as relax and recover from everyday demands (WHO Regional Office for Europe, 2016). The link between nature and health has been given a lot of attention in the last years and numerous researchers have been trying to assess which environments and underlying mechanisms affect human health (Hartig et al., 2014). Urban cemeteries are examples of green spaces that, to our knowledge, have not yet been evaluated as a public health resource. Cemeteries in Scandinavia, as in many other parts of the world, are culturally valuable and park-like environments. They are often large green spaces, with a network of paths and benches. In addition, they are often well-maintained compared to other city parks. As seen in a previous study, people use urban cemeteries for a variety of everyday activities such as recreational, social or cultural activities (Evensen et al. 2017). Furthermore, cemeteries can be restorative environments and support mental restoration (Nordh et al. 2017).

Cemeteries constitute part of the green structure of cities. Many old urban cemeteries are located centrally,

and, in densified cities, they may be the closest green space accessible for use near where people live and work. Although cemeteries in Scandinavian countries are juridical public spaces, open for everyone and used by several groups of people, their qualities are not always addressed or mapped in green structure plans. Hence, their role as green urban spaces, providing potential health benefits for people living nearby, becomes invisible. In this study we aim to assess what qualities urban cemeteries in Scandinavia are assigned by people visiting cemeteries and professionals working in green space management. Through different data sources as interviews with users, focus group discussions with people from green space management and cemetery administration, and document study of green structure plans, we assess what qualities cemeteries are assigned in Oslo, Stockholm and Copenhagen. The results of the study will be presented and discussed at the conference.

Keywords | Churchyard, characteristics, graveyard, green structure, park, qualities

References

- Evensen, K. H., Nordh, H., & Skaar, M. (2017). Everyday use of urban cemeteries: A Norwegian case study. *Landscape and Urban Planning*, 159, 76-84.
Hartig, T., Mitchell, R., De Vries, S. & Frumkin, H. (2014). Nature and Health. *Annual Review of Public Health*, 35, 207-228.
Nordh, H., Evensen, K.H., Skår, M. (2017) A peaceful place in the city – A qualitative study of restorative components at the cemetery. Manuscript under review.
WHO Regional Office for Europe. (2016). Urban green spaces and health. A review of evidence. Copenhagen.



Tourist Recreation Facilities of Warsaw Forests Focused on Chosen Users: Women and the Disabled

Wiesława Ł. Nowacka, Małgorzata Woźnicka, Emilia Janeczko

Warsaw University of Life Sciences, Faculty of Forestry, Department of Forest Utilization, Poland

The economic function of the forest resources is still very important, but during the last decades some other functions have come to interest for the public. The primary function of municipal parks, forests in the city and around, is to guarantee satisfactory place for many kinds of social activities. Urban societies need recreation settings just close to their living surroundings.

Planning people's leisure-time is a kind of art. Much is known about expected number of visitors in forestry land with a specific interest to its proximity to a city, projected activity, frequency and duration of the visit, expectations towards specific region, and distribution/numbers of visits in different types of forests. Not much is known about preferences, likes and dislikes of beneficiaries, depending on their gender, age, education, health, physical and mental abilities. This paper discusses some ergonomic aspects of adjusting/preparing forests for recreational needs. It stresses the importance of taking into consideration specific type of users: namely adults, children and special users. Health benefits from a forest recreation may be much larger if they are accomplished with a full satisfaction of a stay. Attention must be also paid to the proper organization of a recreation facility and its infrastructure especially for woman with children and disabled persons.

Warsaw, with a population of nearly 2 million and current area of 517 sq km, is Poland's largest city. The greenery of Warsaw covers 24 % of its area. All Warsaw forests are providing a place for the people's outdoor activities: tourism, photography, bird watching, picnicking, sightseeing, skiing, bicycling, mushroom and berry picking etc. Warsaw is a city with a big recreational pressure on forests.

This paper emphasizes some practical data that need to be considered for planning, designing and creating

forest shelters, benches, parking areas, information tables.

Recreation places in a forest equipped with basic facilities were measured in accordance to basic ergonomic knowledge regarding main positions of a man taking a rest in a forest: walking, sitting, standing. All dimensions of recreation facilities and elements of infrastructure have been measured and potential threats for predicted users have been enumerated. Other aspects were also seen, namely: changes of usefulness, property and safety over the time-span.

Results of research investigations in greater-Warsaw city forests are presented herein. The empirical data obtained were compared with parameters of comfort defined in the anthropological atlas of the Polish population and parameters of the comfort defined upon ergonomic equations (comfort guidelines evaluated among others by Grandjean).

Results gave the assumption that the main cause of inappropriate recreation facilities management is the lack of knowledge concerning ergonomic requirements, resulting from: physiology, anthropometry, biomechanics, and sociology. A straight proof of such conclusions can be found in new recreation facilities that are at starting point but badly designed, inadequately constructed, poorly accomplished, and not responding to beneficiaries' needs and preferences. It must be underlined that today visitors are more knowledgeable not only about forests but also about their physical condition, health threats caused by badly designed things and environment, fitness problems, etc., than the visitors from the past.

Keywords | Ergonomics, women, recreation, forestry, disabled persons



Phytoncide (Natural Volatile Organic Compounds) Concentration Analysis in Korea Pine Forest

Sujin Park, Mi-Ae Jeong, Ye-seul Jo, Cheolmin Kim

Korea National Institute of Forest Science, Republic of Korea

The natural volatile organic compound (NVOC) emitted from trees are known as the phytoncide. Research on the characteristics of phytoncide in forest stands was rarely conducted. Phytoncide is one of the environment factors influencing human health. In advanced researches, phytoncide was an indicator to measure therapeutic effects of forest. In Korea, one related area currently being investigated is forest management strategy for promoting phytoncide generation. This study is intended to examine the characteristics of NVOC concentration by stand density and seasonal change and drawing implication for the forest management strategy. Three sample sites were selected according to stand density in Korean pine (*Pinus Koraiensis*) forest of Pocheon-Si and Gyeonggi-do. NVOC concentration was measured from September 2015 to August 2016. The total 663 samples were used for analysis by stand density and seasonal change. Based on the total volatile organic compound (TVOC), NVOC data, we conducted MANOVA using SPSS 20.0 according to stand density and seasonal change. The concentration showed

variations according to the stand density ($p < 0.01$). The NVOC concentration showed a tendency to increase according to stand density. Each NVOC concentration by stand density was $1.0 \pm 0.59 \mu\text{g}/\text{m}^3$ in 500 trees/ha, $1.2 \pm 0.70 \mu\text{g}/\text{m}^3$ in 600 trees/ha and $1.2 \pm 0.59 \mu\text{g}/\text{m}^3$ in 700 trees/ha. NVOC concentration by seasonal change showed the highest value in summer, having no significant differences between autumn and winter; the NVOC concentration by seasonal change showed $1.1 \pm 0.30 \mu\text{g}/\text{m}^3$ in spring, $1.4 \pm 0.84 \mu\text{g}/\text{m}^3$ in summer, $0.9 \pm 0.32 \mu\text{g}/\text{m}^3$ in autumn and $0.8 \pm 0.32 \mu\text{g}/\text{m}^3$ in winter. NVOC concentration was influenced from stand density and seasonal changes. The results of this study will be used for the forest management strategy in healing forest to promote human health. More research on the NVOC concentration by stand density was needed with analysis in environmental factors.

Keywords | Phytoncide, Natural Volatile Organic compounds, pine forest



Can Psychological Tasks Strengthen Restoration and Improve Mood? Results from a Forest Walk Experiment

Tytti Pasanen, Kalevi Korpela

University of Tampere, Finland

Exposure to natural environments has shown a range of positive effects for humans. The positive short-term effects have been explained by nature's capacity to enhance restoration. Well-known restoration theories, the attention restoration theory (ART) by Kaplan and Kaplan and stress reduction theory (SRT) by Ulrich, explain the outcomes of nature visits but little is still known about what causes these restorative effects. Can restoration be taught or intensified by directed focus on the environment and self-reflection? In this study, we investigate a forest trail equipped with seven psychological tasks, written in signposts, that have been designed based on the abovementioned restoration theories and environmental self-regulation theory used in favourite place studies. We assess whether these psychological tasks designed to intensify restoration during a walk in a forest have an effect compared with a walk without the tasks, or a walk with the tasks completed in the reverse order.

The trail was 6 kilometres long and it was located in a small municipality in Pirkanmaa, Finland. The scenery around the route included lakes, residential houses along gravel roads, traditional and recently clear-cut forests, and a scenic viewpoint. The psychological tasks in the signposts instructed the participants to observe the environment, their physiological and psychological states, and current situation in life. Initially, 150 adult aged 18-81 years participated, of which 16 cases were deleted from the analyses due to problems related to either the walk or the before-after measures. The study took approximately 2.5-3 hours to complete for each participant. Majority of the participants were keen nature visitors, with 70% specifying a particular nature-related hobby. The data was collected during May-September 2016.

All participants (n=134) walked the same route and they were randomly assigned to four walking conditions: a walk with the tasks completed in the correct order

(1/3 of the participants), a walk with the tasks completed in the reverse order (1/3), and a walk without the tasks following either the correct (1/6) or the reverse (1/6) route. We measured four main psychological outcomes before and after the walk: restoration, vitality, empathy, and mood. The analysis was conducted with Mplus version 7.4 as a multilevel model with MLR estimator. The slopes between the before and after measures were specified as random variables which we regressed on the study conditions (tasks/no tasks, correct/reverse route direction), stress in the past four weeks, time of the day, and the duration of the walk.

The preliminary analysis revealed that all outcomes significantly changed to a more positive direction during the study. However, few differences between the study conditions were found. Consistent with previous studies, the change was more positive for those who reported more stress in the past four weeks. Although the psychological tasks along the trail provided one means for achieving restorative effects, similar effects were achieved by those who did not complete the tasks. Previous experimental evidence suggests that so called awareness-plans may enhance the benefits of nature walks. As the majority of the participants in this study were nature-oriented, it is possible that they already knew how to engage with the environment in order to gain positive effects and no tasks were needed. Thus, the results suggest that nature walks can result in increased restoration and improved mood especially among nature-oriented samples but these benefits can be achieved in different ways. More research is needed to assess whether psychological tasks aid restoration in other populations such as in deprived urban communities.

Keywords | Forests, psychological well-being, psychological tasks, walking



Landscape effects on human health and well-being as elements of social innovation in marginalized rural areas: reflections on why and how to evaluate them

Davide Pettenella^[1], Laura Secco^[1], Maria Ninijk^[2], David Miller^[2]

^[1] University of Padova, Italy

^[2] The James Hutton Institute

**Elena Pisani (Italy), Riccardo Da Re (Italy), Catie Burlando (Italy), Mauro Masiero (Italy), Phoebe Koundouri (Greece),
Achilleas Vassilopoulos (Greece), Antonio Lopolito (Italy), Diana Tuomasjukka (Finland), Nico Polman (The Netherlands)**

Social innovation is an emerging topic, identified in the EU Strategy 2020 as one of the crucial, intangible factors required to promote smart, inclusive and sustainable growth. Although there is not yet an unambiguous definition of social innovation, "new social uses" of forests and rural landscapes are identified in the scientific literature and described in terms of social innovation. These include the use of forests and natural landscapes as beneficial to human health and wellbeing (e.g. for stress reduction and salutogenetic effects). Empirical evidence exists of positive effects of access, community volunteering and views of woodlands and natural environments on the health of specific population groups (e.g. disabled, elderly, children). However, a method to comprehensively evaluate direct and indirect long-term impacts that these new types of social uses can provide for society, the economy and institutions is not yet available, while knowledge on short-term effects on health and health assistance costs is limited and fragmented. Reflections will be presented on why and how these effects, including impacts, should be evaluated, with a focus on marginalized rural areas. Results of a more comprehensive evaluation approach would support the design of more effective public policy

and reform of obsolete policy frameworks which, in several European countries, are not accounting for the important role of landscapes and forests for collective well-being. Our reflections are based on the preliminary findings and advancements of a 4-year research project, SIMRA (Social Innovation in Marginalized Rural Areas), funded under the EU Horizon2020 Programme. The project involves 26 partners throughout Europe and the Mediterranean basin, with a network of stakeholders which includes social farmers, social foresters and other social innovation initiatives directly or indirectly linked to the effects of forests and rural landscapes on health and well-being. It is planned to expand this network over coming years to enable the analysis of case studies, including on rural health care. This presentation will provide preliminary ideas and option for discussion about approaches and indicators to be used for capturing the multifaceted aspects of new social uses of forests and landscapes, with a focus on the specificities of health and human well-being in marginalized rural areas.

Keywords | Social innovation, evaluation, indicators, SIMRA, marginalized rural areas



The Meaning of Contact with Nature for Seniors' Well-being

Lidia Ponizy^[1], Agnieszka Dziubała^[1], Monika Latkowska^[2]

^[1] Adam Mickiewicz University in Poznan, Poland

^[2] University of Life Sciences in Warsaw, Poland

Considering the question of ageing population in Poland as well as in many European countries, care facilities for elderly people are gaining more and more importance. Possession of a garden in care facility or an appropriate location in the vicinity of urban green areas affects the improvement of quality of life of seniors staying there. The access to green areas and the possibility of experiencing the nature allow keeping the physical fitness, improving mental health and having influence on strengthening social bonds. However, these benefits sometimes are not noticed (by administrators, planners etc.) and not well adapted gardens and urban green areas do not meet the needs of elderly people, which limits them in use.

To find out how important the ability of using green areas for seniors in nursing homes in the cities is, the survey among the residents of the selected care facilities in two Polish cities -Warsaw and Poznan- was conducted. The aim of the research was to gather information on usage of nursing home gardens and urban green areas in the immediate vicinity as well as to determine the significance of the use of urban green and the needs of seniors in this regard.

For the examination there were chosen nursing homes which: have its own garden and have access to urban green areas in the neighbourhood (i), have a garden but do not have an access to the urban green (ii), do not have a garden nor have an access to urban green (iii). Among the residents of care facilities face to face structured interview were conducted. The interviews in Poznan were conducted in 2016 (in Warsaw they are still ongoing). From 14 care facilities for elderly people in Poznan we chose four, which agreed to cooperate, but also represented three above-mentioned types. Only residents who were able to use gardens and green areas were taken into account, finally a total of 92 residents were interviewed. The main tool of the interview was a questionnaire filled in by the interviewer.

The questionnaire was divided into five parts. First, the general was addressed to all respondents; the second part concerned the garden in the care facility, the third part included questions related to green areas in the vicinity of the care facility, the fourth was addressed to residents of care facility having neither garden nor access to the urban green areas. The fifth part included respondent's particulars.

Respondents were asked, among others, about the development of the garden, how they use it and how often; what their expectations on the garden are; whether they visit green areas near the care facility; with whom they spend time there; what they would like to change in the garden to make it more suitable for them, and so on.

The vast majority of seniors residing in a nursing home responded that they used the garden (when it was in the care facility), and this possibility was very important to them. Mainly they use the garden for walking, watching the wildlife, but it also is a place for meetings and discussions with other residents. The gardens are quite well equipped but residents would like to have a place to cultivate vegetables and fruits. They also would like to have pets in the garden and equipment for the observation of wild animals (feeder). Despite the fact that the care facility has a garden, seniors also visit green areas in the vicinity of the facility. The possibility of using green areas outside the nursing home is limited by insufficient staff to accompany the inmates.

Possibility of contact with nature by allowing the use of the garden and visiting urban green areas in the vicinity is very important in the opinion of the seniors for their quality of life. Research shows that it would be more active involvement of seniors in outdoor activities through the possibility of doing gardening or activities related to the care of pets.

Keywords | Ageing population, care facility, urban green



Fitness Training Outdoors – Opportunities for a New Offer in Urban Forests and Parks?

Ulrike Pröbstl-Haider^[1], René Moussong^[2]

^[1] Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences Vienna, Austria

^[2] Fitness Union Wien, Austria

Statement of the problem and methods

Fitness studios are booming in most European cities. However, most fitness training is offered indoors. Since several studies show that being outdoors would provide additional positive health effects, this study asked 250 members of a fitness studio in Vienna whether they would be interested in expanding their training to the outdoors and under which conditions they would join such courses. In addition, 36 respondents were asked the same questions after participating in a free fitness training course in Viennese parks. The survey analyses possible push and pull factors such as weather conditions, social pressure, accessibility and seasonality, and develops recommendations for new offers.

Major results

The study shows that 80 % of the respondents were attracted in general by the training options outdoors. Younger respondents (between 26 and 35 years) and respondents with little exercise during their work days were more attracted than others. Nearly all respondents (90 %) believed that stress reducing effects were greater when participating in outdoor fitness offers. The likelihood of participating was negatively influenced, on the other hand, by bad weather conditions and more than 30 minutes' travel time to the park. The study also revealed that the majority (73 %) would only be

interested in group training (6-8 persons) since single training is perceived as being too expensive. The fee should not exceed 6-10 Euros per unit and per person.

After the active participation in outdoor fitness offers, the second group of respondents highlighted that they felt very comfortable with this kind of training, explicitly mentioning the experience of "fresh air", "silence" and "freedom". Many respondents were also attracted by the positive group dynamics. The presence of other people and dogs running free in the park were the most disturbing aspects. The guidance and spatially adapted composition of different training units (such as warming up, running, balancing and stretching) by an experienced coach are essential for a successful implementation of outdoor fitness offers in urban forests and parks.

Concluding statement

The current use of urban forests and parks for health and well-being could be enhanced by a new offers provided by fitness studios. The study illustrated the main preconditions for the successful implementation of such an offer.

Keywords | Fitness offer outdoors, stress reduction, disturbance, coaching, access



Green Care Auszeithof - Preventive Healthcare at a Farm

Nicole Prop

Green Care Austria, Austria

The Farm as a Health Resort

International research shows that spending time in nature and having contact with animals have a health-promoting effect on humans. Seen as health resorts, farms offer a unique combination of animals and nature, as such *Green Care - where people flourish* - becomes useful for promoting good health. When an entire farm becomes a place of active recreation in and with nature, and cooperates with external health care experts, we call it a *Green Care Auszeithof* (a "time-out farm").

Green Care Auszeithof

How can the simple things be made tangible? That longing for the countryside, for nature, for physical activity, or simply to be left alone? Many people connect these longings with staying on a farm. They are not looking for something unusual there, not for the ultimate new experience, but rather just the opposite: the simple. Be it the contact with animals, an experience of the forest, or the opportunity to work not only with their heads, but also once again with their hands. At a *Green Care Auszeithof* we use the resources of a farm quite deliberately to promote health and well-being, without sacrificing the simplicity of the educational program. Each farm offers its unique preventive healthcare offer. The offer of a *Green Care Auszeithof* cannot be generalized as each farm is different. Sure, there are basic conditions and essentials, but each farm, with the people who manage it and the nature and animals onsite, remains unique. A *Green Care Auszeithof* is health promotion on an active farm. There is no Nordic walking, no sauna complex, and no fitness trail in the yard. This does not mean esoteric self-discovery; there is no idealization of „mother nature" or romanticizing of the „simple" farmer's life. If you have the feeling, or perhaps the certainty that something must be done for your health, you will meet farmers at a *Green Care Auszeithof* who have been sensitized to the topic through the „Green Care - Promoting Health on the Farm" certification course. People who have studied to

meaningfully combine their rural knowledge with the qualifications in education, health and social services areas are available on many farms. There are people who know that health has something to do with structuring your time, spatial experiences, activities and relationships, and how they can deliberately combine these determinants with the particular resources of their farm. But also people who look for networking and cooperation with regional experts from the health care sector and to then create these harmonious health-promoting offers for their guests. Above all, however, people who can create the right balance between peace and activity and who, despite all their designs, can also let their farm be a farm.

Green care - where people flourish / Green Care in agriculture and forestry

The association "Green Care Austria" initiated "Green Care – where people flourish". Since March 2011 Austrian farmers' nutritional and environmental expertise has been broadened by a social component: Green Care. This new range of products comprises four areas: pedagogy, therapy, nursing & care, and social work. It represents a wealth of products and services that are offered directly in agricultural and/or silvicultural businesses in cooperation with charities and institutions. Green Care constitutes an additional source of income for farmers in the context of diversification, alongside tourism opportunities such as "Holiday on the Farm" and direct marketing by farms "Good Things from the Farm".

Comments: The association "Green Care Austria" is an official partner of „Green Care Forest" (Federal Research and Training Centre for Forests, Natural Hazards and Landscape/BFW)

Keywords | Green Care, Farm, Healthcare



Quantifying Ecosystem Services of Urban Forests in the Urban Area of Augsburg

Joachim Rathmann^[1], Christoph Beck^[2]

^[1] University of Würzburg, Germany

^[2] University of Augsburg, Germany

Forests are of major importance to human society worldwide, contributing to several ecosystem services fundamentally. In this context, biodiversity is regarded as a key factor. In recent years, numerous studies identified deadwood (non-living tree biomass including standing or lying woody debris or pile wood volumes) as a crucial precondition for forest biodiversity with remarkable importance for different supporting, provisioning and regulating ecosystems services. However, existing studies also indicate that neither forest visitors nor the public welcome higher shares of deadwood due to several reasons. This shows that considerable trade-offs exist between different ecosystem services.

These trade-offs are subject of a current large research project called BioHolz (<http://www.bioholz-projekt.de>) which evaluates ecosystem services and biodiversity in a multidisciplinary perspective focusing on deadwood.

The project is structured into several work packages – the one presented in this contribution mainly focuses on visitors' perception of deadwood and related specific effects on recreation, well-being and health. Complementary research activities – which are documented in this contribution – aim at the quantification of the beneficial effects of urban forests regarding the climatic and bioclimatic conditions in the urban environment.

In this contribution we present the conceptual approach and first results of an onsite survey in the third largest urban forest in Germany (Augsburg, Bavaria, southern Germany) in order to get information about forest recreation behaviour, the economic valuation of forest recreation benefits, the bioclimatic conditions and the perception of deadwood.

Preliminary results based on 319 interviews conducted in summer 2016 generally show that urban forests can significantly contribute to health and restoration. Forests provide social spaces where people can spend time with friends and family, leading to an average willingness to pay five Euros per month underlining the high importance of urban forests for the visitors.

Concerning climatic and bioclimatic effects of urban forests in the urban area of Augsburg several measurement campaigns have been performed in summer 2016. Preliminary results document pronounced differences between forested and built-up areas with respect to air temperature, humidity and derived bioclimatic parameters. In summary, results prove the potential positive effects of urban forests on bioclimatic conditions (e.g. reduction in maximum temperatures).

The mentioned initial studies are continued this winter (2016/2017) to account for seasonal variations in forest perception and recreation and as well climatic and bioclimatic aspects.

This study is supported by the German Federal Ministry of Education and Research BMBF and the Federal Agency for Nature Conservation BfN, funded by the Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety BMUB).

Keywords | Urban Forests, Ecosystem Services, Bioclimate, Human well-being



EUSALP – An EU Macro-regional Strategy for the Valorization of the Alpine Region as Globally Attractive Health Promoting Place

Christina Pichler ^[1], Christian Salletmaier ^[7], Arnulf Hartl ^[1], Christina De Capitani ^[2], Iztok Altbauer ^[3],
Barbara Ruffoni ^[4], Matthias Zink ^[5], Elisabeth Loock ^[6]

^[1] Paracelsus Medical University Salzburg - Institute of Ecomedicine, Austria

^[2] Lombardy Cluster Technology for living Environments, Italy

^[3] Slovenian Spas Association, Slovenia

^[4] CREA - Ornamental Plant Research Unit, Italy

^[5] Ministry of Justice and European Affairs Baden-Württemberg, Germany

^[6] Bavarian State Institute for Agriculture, Germany

^[7] Federal State of Salzburg - Regional Development and EU Regional Policy, Austria

The Alpine region is characterized by an exceptional nature and landscape, healthy climate and high environmental quality. It disposes of a wide range of regional and local natural health resources, which build excellent prerequisites for the emerging trend of nature-based health tourism. Alpine regions are e.g. characterized by a lower level of allergen exposure, lower fine dust and, thus, better air quality, 3D terrain and cooler temperature than regions at lower altitudes. The Alpine region is therefore uniquely suitable for offering health promotion and prevention programs as well as relief for already persistent diseases.

Despite the unique prerequisites of the Alpine region, there is no strong Alpine identity based on the exceptional natural health resources and thus no global awareness of its health-promoting potential for customers and the local population. The existing fragmentation of Alpine regional development concerning health tourism aspects as well as the little focus on scientific substantiation of health tourism products are major reasons for this lack of awareness and identity. Furthermore, Alpine natural resources are at risk as they are threatened by an increasing development pressure.

These challenges ask for a common European approach with interdisciplinary research, cross-sectoral cooperation and multi-level governance for the development of new concepts for the sustainable valorization of Alpine natural resources. A close cooperation and exchange of knowledge between policy-makers, medical research and health care providers as well as the tourism industry is needed.

To face these opportunities and challenges, a European action group under the chairmanship of the federal state of Salzburg within the EU macro-regional strategy EUSALP was established. The interdisciplinary group is comprised of experts from each EUSALP member state and works on the integration of health

tourism as a strategic development factor for the valorization of Alpine regions as globally attractive health promoting places.

The action plan includes following objectives and measures:

- Setting up transnational and interdisciplinary networks for the identification and (re-)evaluation of location-based natural health resources as well as traditional medical heritage.
- Development of new health tourism products and service chains with evidence-based health effects for Alpine destinations based on sustainable, renewable and location-specific resources.
- Creating a better understanding and develop models to harmonize the regulation in the Alpine region for the smart and sustainable use of natural Alpine resources.
- Cross-fertilization of Alpine health resources and SMEs to generate new business scenarios and sustainable economic value chains through the integration of research and enterprises from different sectors like agriculture, gastronomy, building/ construction, medical technology and health related services as well as medical plants and traditional applications.
- Stimulation of knowledge and qualification initiatives for the triggering of SME- and destination-driven innovation.

Through this European initiative, health tourism can be positioned as a core area for the establishment of new forms of sustainable Alpine tourism strategies that ensure a strong position for the Alpine region in the global market as health promoting place for customers and the local population.

Keywords | EUSALP, EU-macro-regional strategy, health tourism, natural health resources, Alpine region



German Forest Kindergartens: Long Term Impacts on Physical, Mental and Social Well-being

Silvia Schäffer, Thomas Kistemann

GeoHealth Centre, Institute of Hygiene and Public Health, University of Bonn, Germany

According to empirical work and theoretical concepts such as the Attention Restoration Theory (ART) contact with nature promotes physical, mental as well as social well-being. Forest kindergartens are one example of regular and institutionalized nature experience during childhood. They shift the care of 2-6 year old children from indoors to outdoors, thus enabling direct exposure to nature. However, studies on the long-term positive health and wellbeing impact of regular natural experiences in childhood are rare.

By use of a two-part interdisciplinary mixed method research the setting forest kindergarten was analysed regarding to long-term health consequences for the physical, mental and social well-being. Participative observations and qualitative interviews with teachers in 13 German forest kindergartens provided comprehensive insight into the character and organization of forest kindergartens (Part 1). Around 100 elementary school children who had previously attended a forest kindergarten were surveyed (Part 2). The health effects were analysed by the use of a motoric screening, a questionnaire on subjective health assessment and qualitative interviews. To compare the data 250 primary school pupils who had attended a regular kindergarten were as controls examined and matched with the data of the study on the health of children and adolescents (KiGGS) of the Robert Koch-Institute. Finally the results from Part 1 and Part 2 were triangulated.

The evaluation of the data has shown that attending a forest kindergarten has positive health effects on physical, mental and social levels. On a physical level, these effects concern predominantly better mobility, coordination and endurance. In particular, girls showed significantly better values in subjective health assessment and in physical well-being when they had attended a forest kindergarten. Better health was assumed by forest kindergarten teachers through movement, a healthy diet, the temperature household and hygiene.

Daily life in the forest kindergarten was marked by games supporting self-determination and calmness without overstimulation, with positive effects on self-esteem and mental well-being. Again, girls showed the highest values. Teachers from multiple forest kindergartens also named the ability of focusing, listening and being creative as well as language skills to interpret and create their own space. Elementary school students who had attended a forest kindergarten listed many ideas to connect nature and health. They linked fresh air, herbs and relaxation in the forest with symptom relief of e.g. tinnitus.

In the area of social well-being, warmth and helpfulness shape the relationships among the community in the forest kindergarten. Positive memories of the community in forest kindergarten lasted up to primary school times.

The forest kindergarten provides a way for regular nature experience and exercise in early childhood. Based on a combination of two cross-sectional research parts this study indicates that regular nature experiences during kindergarten shows long-term effects on children lasting until school-time.

Positive effects on different dimensions of well-being could empirically be substantiated. Girls in particular were able to achieve significantly better values concerning physical well-being when they had attended a forest kindergarten. The forest kindergarten turned also out to provide great potential for behavioural and situational prevention in childhood in the context of increased awareness of prevention programs.

Keywords | Forest Kindergarten, Children, Physical, Mental, Social



Methods for Enabling Adolescents in Urban Fabrics to Monitor and Reflect Everyday Physical Activity

Thomas Schauppenlehner^[1], Verena Beiser^[2], Irene Bittner^[2], Doris Damyanovic^[2],
Rosa Diketmüller^[3], Franz Mairinger^[3], Martin Niegler^[4]

^[1] University of Natural Resources and Life Sciences, Vienna; Institute of Landscape Development, Recreation and Conservation Planning, Austria

^[2] University of Natural Resources and Life Sciences, Austria

^[3] University Vienna, Department of Sport Science, Austria

^[4] komobile, Vienna, Austria

Since the last decades, sport and physical activity among adolescents decreased rapidly. Many studies claim, that especially computers and mobile technologies lead to less physical activity as gaming and social activities are more and more channelled over these platforms. Furthermore, information on the necessary quantity of activities is mostly unknown, and assumptions about the personal activity patterns differ from reality. Between school, learning and family, adolescents have only little time for sport and physical activity and therefore, everyday activities such as walking or cycling become more important. The project “Active Youth” aims to determine how mobile technologies can be used to collect data on physical activity and mobility behaviours and how mobile devices can contribute to promote physical activity. Together with two Viennese schools (a total of 32 participants at the age of 15-17 years), we collected data on physical activity and spatial patterns for three different recording weeks. We used accelerometers to gather physical activity data and mobile phones to record quantitative spatial data and motion patterns using geo tracker apps. Additionally, qualitative information was gathered using travel diaries.

The results show, that only a few school students reach the WHO recommendations for daily physical activity. The characteristic of the everyday environment (neighbourhoods, routes to school and friends, cycle paths, etc.) is an important factor that can support or prevent activities such as walking with friends or cycling to school.

In a second project phase, location-based games and apps such as geocaching and GPS drawing were tested with the school students to gather the potential of this kind of geo games for the promotion of physical activity. Within one week they tested geocaching and GPS drawing in small groups in their everyday environments and evaluated the process as well as the potential to promote physical activity. The evaluation was carried out with focus group interviews in school classes (with a maximum of 10 persons per group; 3 focus groups in total). Generally, they were impressed how precise spatial information can be provided by smartphones to draw detailed images or to find small caches. Both game approaches were positively rated with a potential to perform it with friends or during holidays. At the same time, the location-based augmented reality game Pokemon Go entered the stage and triggered a temporary boom that forced people to go outside using a smartphone to collect little monsters.

Smartphones and other mobile devices can support data collection as well as outdoor activities among adolescents. Therefore, they can be utilized in physical education lessons or multidisciplinary education (e.g. geography with sports or informatics, arts, etc.) to reflect personal activity patterns and spatial behaviours. Furthermore, gaming approaches can support social youth work or leisure time activities.

Keywords | Mobile devices, physical activities, location-based games



Development of Urban Forests in Urban and Suburban Areas of Switzerland

Michael Schulze, Susanne Karn, Christine Bai

University of Applied Science Rapperswil (HSR), Switzerland

In recent decades developments have already brought changes to the landscape in Switzerland. Settlements and infrastructure are spreading, and the remaining areas are used intensively. At the same time, the densification of urban areas has led to an increase in the population's need for attractive green and open areas near settlements. This applies to both dense urban areas in cities, as well as growing suburban areas. In this context forests can provide a reserve for recreation, human health and wellbeing.

The research project was financed by the European Cooperation in Science and Technology and was part of the COST Action FP 1204: "Green Infrastructure approach: linking environmental with social aspects in studying and managing urban forests". The question was under which circumstances should cities and municipalities develop forests nearby settlements not only for recreational use, but also as part of their multifunctional usable green and open space system? The project team anticipates that by increasing compression in dense urban and suburban areas, municipal development of recreation areas will be urgently needed for human health and wellbeing. Different systems of forest management in conjunction with the intensification of the use of forests can be developed.

A literature review provides a knowledge base for forest management in the context of economics,

recreational use and aesthetic aspects. Furthermore, the project documented good examples of forest concepts in Switzerland and in Europe.

Test areas in the metropolitan regions of Zürich and Basel were selected to have several workshops with forest owners, foresters, green and open space planners and landscape architects. The goals of the workshops were to identify target groups, stakeholders and their needs, to discuss test designs of test forests and to generate new solutions for recreation in the future.

An initial review of the findings enables conclusions to be made regarding the implementation and design options of recreational used forests, as well as promoting and hindering factors for the development of recreation related forest development in Switzerland.

It is evident that the assessment of the recreational use and the quality of forests are currently dependent on the commitment and cooperation of the forest owners and foresters. For example, there is a gap between the high priority of recreation by the public and the lack of funding to honour the recreation development.

The results of the research project will be summarized as recommendations and will be published in 2017.

Keywords | Urban forest, Urban Forestry, Recreation, Urban and suburban development



Relaxation and Social Activities in the Garden Promote Perceived Health

Markus Schwab, Renate Cervinka

University College for Agrarian and Environmental Pedagogy, Austria

Evidence on the positive health effects of green space is piling. Studies investigating health effects of private gardens reported better health of gardeners compared to neighbours with no garden. Furthermore, people who had access to a garden reported more social contact, physical activity, and less stress. Thus it was expected that the positive effect of gardens and gardening might be explained by three mechanisms, namely social contact, physical activity, and restoration. To bring the positive mechanism to effect it is necessary to be in the garden. Accordingly, the frequency of stays in the garden was expected to predict health. The aim of this study was to investigate the effect of the frequency of garden visits on perceived health, by considering social contacts, physical activity and perceived restorativeness as mediators.

In an online survey 487 participants (64 % female; mean age = 49.21, SD = 11.89) answered questions on frequency of garden visits, social contacts, physical activity, perceived restorative potential of the garden, perceived health, age, sex, and education. Maximum-Likelihood-bootstrapping (5000 bootstrap-samples) and bias corrected confidence intervals were used to evaluate direct, indirect and total effects.

No significant association between frequency of garden visits and perceived health was found. But, a significant indirect effect appeared. All three mediators significantly correlated with the frequency of visits. Social activities and the perceived restorative potential of the

garden predicted perceived health, but physical activity did not.

This study investigated three mediating mechanisms in one model. Prior studies on the restorative effects of green space reported positive effects on health in general, but inconsistent results with respect to physical activity and social contact. The findings of this study on perceived health in private gardens add to the findings of prior research in green space. Restorativeness and social contact appeared as significant mediators between the number of stays in the garden and perceived health. Physical activity however, did not. Prior research identified gardeners as more physical active compared to non-gardeners. This study solely consisted of gardeners; this might explain why physical activity did not contribute to health significantly. Further, the group was very homogeneous with respect to the frequency of garden use. The small variance found might be responsible for the non-significant relationship between the frequency of garden visits and perceived health. There is another limitation: the cross-sectional design does not allow causal conclusions. This research highlighted the importance of restoring green space for human health. We therefore suggest providing places with certified restorativeness not only in private gardens but also in public green space to foster Public Health.

Keywords | Well-being, allotment, restoration, green space, allotment



Benefits of Gardens on Human Health and Well-being

Birgit Steininger, Dorit Haubenhofer, Renate Cervinka, Markus Schwab, Hubert Schlieber, Roswitha Wolf

University College for Agrarian and Environmental Pedagogy, Austria

Gardening and garden related activities gain ground in learning and health promotion. This holds for the individual level, the societal level and the practical implementation in education, prevention and therapy. For this study two main questions occurred:

- 1) In which ways do gardens and places to provide well-being and health?
- 2) To what extent are activities (for example gardening or social interaction) relevant to promote well-being and health?

The study was aimed to provide information about the effects of different garden types on health and well-being.

Method

Using electronic databases, a comprehensive search of peer reviewed papers published between 1980 and November 2015 was conducted. The search considered beneficial as well as adverse effects (frustration, accidents, and work load for personal) of gardens and gardening on health and well-being of users.

Results and Discussion

The reviewed papers showed that no clear separable answer for the main questions is possible, a highly complex interaction exists. A garden is a very individual setting; place and activity interact strongly, as well as other factors, as time, do have a strong influence.

Findings revealed beneficial effects of gardens and gardening on the physical, mental, social and educational aspects of health for the different garden-types under investigation.

- 1) Research on **private gardens** is dedicated to all population groups, the biggest group is elderly. Existing Research shows that private gardening is healthy for older persons. It is a meaningful activity that can be matches to the physical and psychological ability, and is not bond to a schedule. At the same time the garden and nature activate and relax body and mind.
- 2) Research on **community gardens** lays focus on interactive, communicative and connecting mechanisms while gardening for local food production.

- 3) Research on **schoolgrounds** is related to the effects on school performance of children and adolescents and their eating habits. Positive effects could be described.
- 4) The main task of **healing gardens** is the promotion of intellectual and physical health, well-being and quality of life. Positive effects of healing gardens have been found for different diseases, mainly within the field of psychiatry and neurology. Mainly positive outputs have been described, but persons with dementia can show negative effects as well.

Main topics for physical benefits were higher levels of physical activity, better motor skills, and healthier nutrition behavior. Reported mental benefits were: reduced mental stress, improved mood, better cognitive functioning, experienced achievement, and development and maintenance of identity in the garden. Social benefits were sharing knowledge and produce, better learning, feelings of social cohesion, and community involvement. These positive findings encourage application of garden-based-interventions in Green Care.

However, numerous reviews advise to handle findings and generalizations with care due to flaws in research design and limited methodology. Additionally, they do not discriminate between the effects of the gardens, and the effects of the activity in the garden. The resulting data collection serves as a teaching material for students of the University College for Agrarian and Environmental Pedagogy.

Recommendations

The given body of knowledge encourages practical applications of garden-related interventions in the various settings. However, these interventions should be planned with care and evaluated using established methods. Further, future research should rely on theory and apply appropriate study designs. This seems important for both strands of research, the one on the effects of gardens as well as gardening on health and well-being.

Keywords | Horticulture therapy



Valuation Study of Social and Economic Benefits Generated by Barigui Park in Brazil to Society

Leide Takahashi, Claudio Henschel De Matos, Marion Leticia Bartolamei Silva

Fundação Grupo Boticário de Proteção à Natureza, Brazil

Barigui Park is the most relevant protected area in the capital of Paraná State, Brazil. With a total area of 140 hectares it houses important remaining forest, native and migratory species and an average of 9 million visitors per year. The park is located in a privileged and highly accessible area and presents an interesting infrastructure that attracts a varied public.

Despite of being one of the city's most recognizable symbols, investments directed to the maintenance of the area are far from sufficient. Thus, in order to raise a flag to the problem and get both policy makers and society aware of the importance of investing in the creation, maintenance and extension of protected areas, this study aimed at valuating the social and economic benefits generated by the most visited protected area in the city.

Throughout the study the methodology compares scenarios considering the city WITH and WITHOUT the protected area. In that context, six benefits were considered and treated separately based on data provided by the managers of the area as well as specific reading materials and official websites, such as:

- 1) Recreation: economic impact generated by park visitation;
- 2) Green taxation / tax revenue distribution: in Brazil, states treat green taxation differently - in a number of states parks can generate revenue;
- 3) Impact of personnel hiring and local purchasing: expenditure arising from maintenance and operation of the area as well as employee payroll;
- 4) Environmental Education: investments made in environmental education programs open to the public in general, including food, beverage and transportation expenditure;
- 5) Scientific Research: investments toward the promotion of scientific research carried out in the area;
- 6) Reducing Emissions from Deforestation and Forest Degradation – REDD: total volume of avoided greenhouse gas emissions.

The most relevant results are presented in table 1 where all 6 social and economic benefits generated by the

Table 1:
Social and Economic Benefits Generated by Barigui Park in 2015, Curitiba-Pr, Brazil.

Benefits	Conservative Estimate (BRL/Year)
Recreation	37.789.088,32
Green Tax	749.178,91
Local hiring and purchasing impact	4.495.462,40
Environmental Education	96.213,43
Scientific Research	90.000,00
REDD	17.839,44
TOTAL	BRL 43.237.782,50*
*1 EUR = 3,60 BRL	

existence of the park amounted BRL 43.237.782,50 versus an annual investment of BRL 3.458.048,00. Therefore, for each BRL 1,00 invested in the maintenance and implementation of the park, an excess of BRL 12.50 returned to the society as benefit. This information builds an extremely robust argument to new public policies in Curitiba – both to the implementation of existing parks and the creation of new areas.

In conclusion, it is worth mentioning that the valuation model developed by the Boticário Group Foundation for Nature Protection was able to demonstrate that public and private investments made these protected areas generate relevant social and economic assets.

Studies as this have the potential to strengthen the Protected Areas System, contributing to verifying the relevance of parks as productive areas and bringing them closer to other processes of human, social and economic development.

Investing in the conservation of natural areas is also investing in the economy of society and generates financial assets with benefits that contribute to national wealth.

Keywords | Valuation benefits, urban park, social impacts, economic benefit



Forest Walking after Rehabilitation: A Randomised Controlled Trial Among Patients with Heart and Vascular Disease

Karin Tanja-Dijkstra^[1], Agnes van den Berg^[2], Jolanda Maas^[1]

^[1] VU Amsterdam, Netherlands

^[2] University of Groningen, Netherlands

Together with the growing awareness of the benefits of nature for human health and well-being, there is a world-wide increase in green initiatives to support people in getting and maintaining healthy lifestyles. This is of particular relevance to certain patient populations suffering from chronic conditions or those at risk of developing chronic illnesses.

In a randomised controlled trial, we focus on these populations; patients who took part in rehabilitation programs after heart and vascular problems. One of the big challenges is maintaining a healthy level of physical activity after their rehabilitation program has finished. Once they are on their own, there is a tendency they slip into old habits of physical inactivity, which is particularly problematic given the direct relationship between physical activity and their diseases.

We therefore designed an eight-week forest walking program in which patients go for an one-hour walk twice a week in a small group, guided by a physical therapist. This program aims to help patients in maintaining a healthy fitness regime, provide them with the confidence that they are capable again of exercising outdoors, and improve their overall health and well-being. All patients who completed their rehabilitation program at the hospital are eligible to participate in the study.

In this study, 80 patients will be randomly assigned to either the walking group or a standard care control group. The standard care control group will leave the rehabilitation program with advise to stay active and take on the responsibility to do so, as per usual care. At baseline patients' general level of health and well-being will be assessed, both through questionnaires (including SF-36, Rosenberg Self Esteem Scale, and General Self Efficacy Scale) and a standardised physical test (shuttle walk test). During the walking program the patients will indicate their perceived exertion (BORG-RPE) after each walk. At the end of the program, patients will complete the same standardised test and complete a second questionnaire in which we will measure their perceived progress (Global Perceived Effect), an evaluation of the walking program, and re-assess their overall health and well-being.

In this presentation we will present the preliminary findings of this trial that has just started recruiting patients to participate in the study.

Keywords | Therapy, forest, walking, patients



Humans, Non-Humans and Health in the Amazon Forest

Camilo Torres ^[1], Gerard Verschoor ^[2]

^[1] Universidad Jorge Tadeo Lozano, Facultad de Ciencias Económicas – Administrativas, Colombia

^[2] Wageningen University, The Netherlands; Sociology of Development and Change, Social Sciences Group, Netherlands

The Amazon displays a level of social and environmental complexity that is not easily intelligible from a Western perspective. For example, human and non-human entities in the Amazon engage in social relationships governed by altruism, reciprocity and diplomacy with a view to achieve some sort of 'balance' which, if obtained, results in 'abundance' for all – especially of health and well-being. If the balance is broken, health and well-being disappears and punishment in the form of illnesses, accidents, food shortages, and all manner of misfortune follows. In many Amazonian societies, balanced and unbalanced situations follow up one another in cyclical fashion in rhythm with the boom and bust of extractive economies (e.g. rubber tapping, fur trade, illegal crops, timber extraction). Gold mining is a new phenomenon attributed to have caused an unbalanced situation. Arriving in the Middle Caquetá River (Colombia) around 2009, artisanal dredge suction gold mining has been linked to negative health effects on both humans and non-humans.

Our paper engages new forms of ethnographic description (new materialism, multispecies ethnography, posthumanism) to account for the disruption in the relation between health and forests as a consequence of mining. We narrate how forest, plants, rituals and spaces affect one another in both positive and negative ways, and illustrate how shamans attempt to tackle the disruption brought about by gold mining through the exercise of multispecies diplomacy. Ethnographic material was collected during several periods of fieldwork among indigenous Andoque people in which we collected stories that linked health, forests, local people sacred sites, wild animals, and forest spirits.

Focusing on the relationship between human and more-than-human beings we show that, in order to repair felt unbalances, shamans (mediators between human and non-human entities) engage in the exercise

of diplomacy inside this forest. Shamans hereby bridge different dimensions and address a multitude of entities in order to re-establish a healthy community of forest denizens. We describe how, in doing so, shamans need to provide gifts for the forest spirits; this involves complex negotiations in which the importance of coexistence and tolerance between all entities is stressed.

An interesting finding of our study is that, according to local people, non-human entities also get sick from the same mining-related activities. Treatment for the same diseases however may differ between species: what works well for humans may not work well for non-humans, and vice-versa. This points to the existence of different and sometimes overlapping uses of curative plants, healing sites, and therapeutic methods; that is, to the co-existence of human and non-human knowledges. While remedies and methods differ or overlap among species, the forest nevertheless provides them for all.

We conclude that the Amazon forest provides a wide set of environmental amenities that together may sustain the health of all who share its sylvan 'body' or territory. As shown through the advent of extractive activities in the past, this 'health-ability' of the forest is likely to break down when diplomacy between the different entities of the forest is weakened. Disruption by extractive activities has been cyclical however, and so far shamans have been attributed with the ability to restore diplomacy and thus health. It remains to be seen whether the devastations brought by gold mining can be reversed in time to warrant the bond between health and the Amazon forest.

Keywords | Colombian Amazon; Abundance; Forest and welfare; Cosmopolitics; New materialism, Ethnography, Posthumanism; Flat ontology



Effects of Spatial Resolution on the Associations Between Urban Green Landscape and Human Health

Wei-Lun Tsai, Yu-Fai Leung, Melissa McHale, Myron Floyd

North Carolina State University, USA

Landscape patterns influence ecological processes and subsequently affect how human beings interact with the environment and derive benefits from ecosystem services. Studies that examine these patterns and processes rely heavily on spatial data, whereby the observed relationships can vary subject to the change in spatial resolution. This phenomenon is known as the modifiable areal unit problem (MAUP). Urban green landscape is identified as an important factor in promoting human health through a broad range of ecosystem services, including providing places for physical activity and social engagement, and ameliorating adverse environmental effects. Empirical support for landscape-human health linkages includes that people who live in greener environments have greater longevity, and living in areas with higher greenness helps reduce all-cause mortality. Effects of resolution change on evaluating landscape patterns and ecosystem functions have been widely studied, whereas its effects on interpreting landscape-human health relationships remain unexplored. This study aimed to address this research gap by employing landscape metrics generated by land cover data at three resolutions (1-m, 10-m, and 30-m) using the City of Baltimore, Maryland, USA, as an example.

A 1-m land cover dataset from the Baltimore Ecosystem Study – Long Term Ecological Research was used as the base layer to generate 10-m and 30-m land cover data. Seven landscape metrics, including percent landscape, mean patch area, patch density, edge density, edge contrast index, Euclidean distance, and patch cohesion index, were generated for coarse vegetation and fine vegetation at three resolutions for the fifty-five neighborhoods according to how people may interact with greenspaces. Life expectancy at birth from the

Neighborhood Health Profile (NHP), Baltimore City Department of Health, at the geographic entity of community statistical area (CSA) was used as the health variable. Baltimore City comprises fifty-five CSAs. Population density, housing density, median household income, and race were considered as the confounding factors in this study. Spearman's rho correlation was applied to examine the bivariate relationship, and regression models including stepwise and hierarchical models were used to examine the multivariate relationship.

The overall landscape compositions at 1-m, 10-m, and 30-m were similar, whereas some landscape metrics, such as patch density and edge density, had substantial variability with resolution change. Most of the landscape metrics of coarse vegetation type had increasingly significant associations with life expectancy from 1-m to 30-m resolution. In regression models without controlling for confounding factors, the landscape metrics generated at 1-m resolution could explain the most variability of life expectancy model, whereas landscape metrics generated at 30-m resolution could explain the most variability in the models with the control of confounding factors.

Findings from this study have several implications for landscape management. It is important to acknowledge the resolution effects on the observed relationships with human health, as well as its combining effects with confounding factors. The selection of resolution and interpretation of the results for landscape planning and management decisions have to be carefully examined.

Keywords | Spatial resolution, Landscape metrics, Green landscape, Life expectancy



The Importance of Experience-settings in Therapeutic Landscapes

Stefan Türk^[1], Dominica Buchelt^[2]

^[1] German Sport University Cologne, Germany

^[2] Germany

Movement and recreational activities in nature and landscape are generally granted a positive impact on human health and well-being. Numerous studies confirm the positive effects on mental and physical motives and indicators (e.g. Hunziker & Bauer 2009). Wilbert Gesler's concept of Therapeutic Landscapes hypothesized in this context that landscapes themselves can be associated with physical, mental or spiritual healing (Gesler 1993).

These effects are based on the fact that positive emotional effects originate from specific types of landscape (Schober 2008). Following this theory, elder spa parks are being newly planned and developed through landscaping to therapeutic landscapes. The aim of such soft or hard landscaping is to create experience-settings like places and areas where calming, revitalizing, constructive or exhilarating atmospheres can help support therapies or treatments. These settings have been proven to increase the probability and intensity of experiences. But are staged landscapes actually able to generate such a positive effect on the sensation of experiences? And are they able to support the therapeutic impact of landscapes?

In order to investigate these questions, a therapeutic landscape was selected, which had the appropriate experience-settings. To exclude or at least minimize distractions of the visitors by other external influences it is of methodical importance that the settings are being emphasized in an isolated way. The quality of the experience was determined by a written survey in the special form of a pre-post assessment (N=100). The survey was based on the theory of experience economy by Pine and Gilmore (1999), according to which an optimal experience is composed of the fields

entertainment, education, escapism and aesthetics. Therefor the visitors were asked after visiting the park if they had have interesting sightings, if they learned something new, if they loosed trouble, and if the park was pleasant. Only visitors marking all four experience fields as fulfilled have been assigned to the sweet pot (N=58). Such sweet spots in particular influence the three follow-up parameters: positive memory, tendency to recommend and individual willingness to pay.

Using the pre-post assessment, with evaluation systems by school marks, the fulfilments of the experience-settings were tested. As it is difficult to exploit the effect of natural experiences the three follow-up parameters should be used as an evaluation aid for quality and effectiveness. The rating of the follow-up parameters has then been analysed descriptively.

It becomes apparent that arranged settings can actually encourage an experience. The results of the rating of the follow-up parameters prove that a competent experience management can make an important contribution to therapeutic landscapes. It is of importance, that experience-settings are strategically thought out and do not question the credibility and authenticity of the landscape, but noticeably underline them. The visitors obviously feel comfortable in such therapeutic landscapes highlighted by experience-settings and enjoy the positive salutogenetic effect of health touristic destination. Additional suitable parks agree with the therapy and accordingly become part of it.

Keywords | experience-settings, therapeutic landscapes, salutogenetic effect, health touristic destination

References

- Gesler, W.M. 1993: Therapeutic landscapes: theory and a case study of Epidaurous, Greece. *Environment & Planning* 11, 171-189
Pine, B.J. & Gilmore, J. 1998: Welcome to the experience economy. *Harvard Business Review* 76, 97-105
Schober, R. 2008: Landschaft als Therapie. *Natur & Heilen*, 9/2008
Hunziker, M. & Bauer, N. (eds.) 2009: Health and Recreation in Forest and Landscape. Intern. Conf., WSL Birmensdorf, Switzerland. 01.04.-03.04.2009. Book of abstracts. 121 pp.



Health Effects of Living in Green Environment – Case Study from Helsinki, Finland

Liisa Tyrväinen^[1], Marjo Neuvonen^[1], Harri Silvennoinen^[2]

^[1] Natural Resources Institute Finland, Finland

^[2] University of Eastern Finland, Finland

Although Finnish cities are still fairly green compared to the European average, heavy pressures are placed on green spaces of the largest growth centers such as the Helsinki Metropolitan Area. Therefore, more rigorous information is needed about health benefits of green areas to secure their provision in urban planning. Although the health effects of green exposure has been increasingly studied (e.g. Maas et al 2008, Hartig et al. 2014, Tyrväinen et al. 2014, Pietilä et al. 2015), there is still a lack of consistent scientific knowledge of the long-term benefits of living in the green environment.

This study investigated the linkages between perceived health, use of neighborhood green areas, and green infrastructure in residential environments in respect to accessibility and quality of green areas. A mail survey data from Helsinki were collected with a total of 872 responses from randomly sampled residents (response rate 41.2 %) between 15-75 years old. Information of the respondents' self-evaluated health status was inquired (scale 1-5). Respondents were divided into two groups - urban (city center, n=229) or suburban residents (n=636). The survey data were supplemented with GIS-derived data of each respondent's quality of the living environments to describe the amount and quality of green areas. The data included also respondent reported information regarding the amount and accessibility of green space in the neighborhood area. Several spatial measures were used, such as the distances to green or water areas and the share of nature areas within a one-kilometer radius

from the informants' home. Pearson Chi-Square, T-test, Spearman correlation as well as path analysis were used in the data analysis.

The results show that in the suburbs good supply of and easy access to green spaces contributes to improved perceived health mainly through increased physical activity. Good accessibility to green areas combined with the residents' satisfaction to green areas regarding nature experiences, a place suitable for social interaction and outdoor activities correlated positively with the increased usage of nature areas and consequently had a positive indirect association with better health status. In urban residential areas, however, association between health and more frequent use were not statistically proven. The study revealed the difficulty to describe the quality of living environment for residents' point of view. The objectively measured GIS-variables functioned less well as an explanatory variable in the statistical models than residents' subjective assessment of the accessibility of green areas.

In conclusion, easy accessibility to greenspaces should be an important objective in urban planning. In contrast, extensive land-use intensification and construction on nature areas in suburbs may lead to decreased physical exercise and consequently to increased health related lifestyle diseases.

Keywords | Urban green areas, physical health benefits, GIS-data, perceived health

References

- Hartig, T., Mitchell, R., De Vries, S., & Frumkin, H. (2014). Nature and health. *Annual review of public health*, 35, 207-228.
- Maas, J., Verheij, R. A., Spreeuwenberg, P., & Groenewegen, P. P. (2008). Physical activity as a possible mechanism behind the relationship between green space and health: a multilevel analysis. *BMC Public Health*, 8(1), 206.
- Pietilä, M., Neuvonen, M., Borodulin, K., Korpela, K., Sievänen, T., & Tyrväinen, L. 2015. The relationship between exposure to urban green spaces, physical activity and self-rated health. *Journal of Outdoor Recreation and Tourism*. doi:10.1016/j.jort.2015.06.006
- Tyrväinen, L., Ojala, A., Korpela, K., Tsunetsugu, Y., Kawaga, T., Lanki, T. 2014. The influence of urban green environments on stress relief measures: A field experiment. *Journal of Environmental Psychology*, 38, 1-9.



Walking with the Physiotherapist: An Evaluation of a Pilot Program among Ten Physiotherapy Practices

Agnes van den Berg

University of Groningen, The Netherlands

Green exercise and other 'green care' programs are increasingly gaining momentum as a cost-effective, easy-to-do, low-risk, and enjoyable preventive and therapeutic intervention with a high social return on investment. Thus far, however, adoption of green care by primary health care providers has been slow. To address this issue, a pilot nature-based walking program was conducted among ten physiotherapy practices in the Netherlands. The pilot was initiated by a major Dutch health insurance company, and focused on patients with a sedentary and socially impoverished lifestyle. Patients who fulfilled the inclusion criteria were invited by their physiotherapist to participate in a 3-month guided walking program, in which patients went for a 1-hour walk in nature once a week in a small group, guided by their physiotherapist.

More than 100 patients participated in the walking groups (83 % women, mean age 60 years). To evaluate the program, participants completed baseline and immediate follow-up exercise tests and self-administered questionnaires about their health and well-being. As

follow-up, both patients and therapists also answered questions about their experiences with the program.

Findings indicate that patients who participated in the program showed significant improvement in their exercise capacity (measured by the six minute walk test) and self-reported health and well-being. Patients also reported a decrease in visits to their GP. Both patients and physiotherapists evaluated the program positively. Patients rated the program an 8.4 on a 1-10 scale. They especially appreciated the social contacts with fellow patients, being outdoors in nature, and the supervision by a healthcare professional. Physiotherapists indicated that the walking program could replace, reduce or complement regular physiotherapy sessions for a majority of chronic patients in their practice. In the presentation I will give a more detailed overview of the results of the study.

Keywords | Health walks, green care, physiotherapy, green exercise



Greening School Grounds: The Benefits of Greening a School Ground on Social-emotional and Cognitive Functioning of Primary School Children

Janke van Dijk-Wesselius^[1], Jolanda Maas^[1], Dieuwke Hovinga^[2], Mark van Vugt^[1], Agnes van den Berg^[3]

^[1] Vrije Universiteit Amsterdam, The Netherlands

^[2] University of Applied Sciences Leiden, Leiden, The Netherlands

^[3] University of Groningen, Groningen, The Netherlands

In a prospective intervention study with a two years follow-up we investigated the benefits of greening school grounds on various domains of children's wellbeing and functioning. Ten schools, situated in the western part of The Netherlands, with approximately 800 children (age 7-9) took part in the project. At a pre-measurement in spring 2014 nine school grounds were paved, one school ground was green. Five more schools greened their school ground between pre-measurement and the first follow-up in spring 2015. Between the first follow-up and second follow-up in spring 2016 these five schools maintained and further developed their green school ground. Data collection covers a broad set of objective and self-reported measurements. In this presentation we will focus on the preliminary results of the impact of greening school grounds on social-emotional and

cognitive functioning of primary school children. In the classroom, cognitive tasks (Letter Digit Substitution Test (Jolles et al., 1995); Sky search task from the TEA-Ch (Manly et al., 2001)) and social games (social orientation choice card (Knight, 1981); egalitarian task (Fehr, Bernahrd & Rockenbach, 2008)) were assessed. Preliminary results partly confirm the hypothesis that greening a school ground leads to small increases in children's ability to concentrate, but only on second follow-up. Furthermore greening seems to have a positive impact on the pro-social behavior of younger children.

Keywords | Children, green space, cognitive functioning, social functioning

References

- Fehr, E., Bernhard, H., & Rockenbach, B. (2008). Egalitarianism in young children. *Nature*, 454, 1079-1084. doi:10.1038/nature07155
- Jolles, J., Houx, P. J., Bxtel, M. P. J. van, & Ponds, R. W. H. M. (1995). Maastricht Aging Study: Determinants of cognitive aging. Maastricht: the Netherlands: Neuropsych.
- Knight, G.P. (1981). Behavioral and sociometric methods of identifying cooperators, competitors, and individualists: Support for the validity of the social orientation construct. *Developmental Psychology*, 17, 430-433.
- Manly, T., Anderson, V., Nimmo-Smith, I., Turner, A., Watson, P., & Robertson, I. H. (2001). The differential assessment of children's attention: The Test of Everyday Attention for Children (TEA-Ch), normative sample, and ADHD performance. *Journal of Child Psychology and Psychiatry*, 42, 1065-1081.



Social Farming in Northern Ireland: Growth and Development

Aoibheann Walsh

Rural Support, Northern Ireland

Social Farming in Northern Ireland is in a period of growth. It has benefitted from raised awareness of the concept within the farming and health and social care sectors and also with the general public. There is Social Farming activity on farms but this is not based on a sustainable funding and referral model at a regional level which has meant that some available farms and experienced farmers are not being utilised to provide a Social Farming service.

Through the Social Farming Social Service for Northern Ireland funded by the Department of Agriculture, Environment and Rural Affairs (DAERA) since October 2015, work has been ongoing to increase Social Farming activity on farms across the region as farmers have invested considerable resources (time, money, the direction of their farm's development) to providing this service. The main motivation for the farmers' efforts has been and continues to be the participants who engage in the service – individuals in need of support who can benefit from being on a farm and completing meaningful activities. To date the experience of Social Farming in Northern Ireland has focussed predominantly on individuals with a Learning Disability and individuals recovering from a Mental Health issue or also individuals with a dual diagnosis who need support from both services.

As part of an effort to increase activity on farms in Northern Ireland, a 'taster session' project was coordinated in Spring 2016. A total of 8 farms provided a service for 29 participants, who had the opportunity to engage for 6 sessions per farm. A total of 148 engagements were delivered. Research was conducted during the project with three groups: the participants supported by their support workers (questionnaires, observation); the farmers (interviews); and Health and

Social Care employees (questionnaire). Results demonstrated that positive changes in participants were noted as a result of engaging in a Social Farming service in improved mood; increased motivation; increased confidence; and increased physical fitness and improved dexterity. In the words of one participant, "I have never been so happy in a long time. I am tired when I go home but it's a nice tired. I feel like I have contributed something and that feels good...I prefer it to being at home or in a day care. It's a dream come true". A positive Social Farmer experience was also noted, with one farmer who delivered the service for the first time stating "I have found it very personally rewarding. It's been good for me".

In order to ensure that Social Farming is an option for individuals living in Northern Ireland in need of support for a variety of reasons further development is needed to increase the number of farms providing a service. This requires funding, which can be delivered with cross-departmental support, and progress on logistical issues such as transport for participants to farms, which can prove a barrier to engagement. Significant progress in the growth and development of Social Farming in Northern Ireland was achieved through the Social Farming Across Borders (SoFAB) project (2011-2014) which piloted activity, trained interested farmers, and raised awareness of the concept. Both the SoFAB outcomes and subsequent progress must be built on to ensure that farmers continue to be engaged and that potential participants can benefit from a service which is person-centred, community-based and conducive to improvements in wellbeing.

Keywords | Social Farming, Northern Ireland, Sustainable model, Participant benefits, Farmer engagement



Modelling Forest Recreation in Baden-Württemberg, Germany

Matthias Wurster^[1], Andy Selter^[2], Arno Röder^[1]

^[1] Forest Research Institute (FVA) Baden-Württemberg, Germany

^[2] Albert-Ludwigs University Freiburg, Germany

The forests in Germany are of great importance for the leisure and health of the population. Accordingly, the Baden-Wuerttemberg Forest Law stipulates that „... the forest functions must be recorded by the forest function mapping ... and must be pursued as necessary.“ In recent decades, both the recreation in forest and landscape (changes in leisure time, the trend towards nature sports) and the societal demands on the forest (for example, the increase in participation, longing for nature) have changed quantitatively and qualitatively very much. Studies in Baden-Württemberg showed that the number of daily visits to the forest is much higher than assumed before. To be able to model these changes on a regular base in the future, the Forest Research Institute (FVA) of Baden-Wuerttemberg started to develop its field of research activity “Forest Recreation” in 2008. On the base of a triangulation of qualitative and quantitative social research methodologies and GIS tools (e.g. ArcGIS extension Network Analyst), a network-based model has been generated to map the spatial distribution of forest visitors. The data consist of two telephone surveys (respectively n=2000 each) and 25 qualitative interviews. All data were collected in Baden-Wuerttemberg in the years 2009 and 2010. With the new modeling method developed by the FVA and the newly developed model, the existing data of the potential forest use for recreation can be updated. For instance, changed spatial modes of motion and use of space by recreation can be derived

and can be mapped cartographically. The model incorporates service areas around settlements, parking spaces and forest entries as well as places of attraction and points of interest. The underlying parameters (e.g. time to the forest, time in the forest, attractiveness like viewpoints, narrow paths or lakes) are directly retrieved from representative inquiries about people’s recreational activities and preferences throughout the state. In 2016/2017 the model’s results, which been intensively validated by forest administrations and tourist offices, will directly influence an imminent update of the recreation function in forest function mapping in Baden-Wuerttemberg, Germany.

To adequately face society’s complex demands of recreation – as intended by the legislative authority in Germany – the potential of forests as recreational areas ought to be optimized through management tools and guidelines like this mapping method. On the one hand, this also provides a tool for forest owners, on the basis of which operational planning and consideration can be made. In addition, the updated and adapted maps are a tool which can be used to identify possible conflicts of forest use and conflicts of interest in the forest, thus possibly preparing policy instruments such as financial support.

Keywords | Recreation, landscape recreation, GIS-mapping, mixed methods



Beneficial Effects of Nature: The Role of Quality and Type of Environment Visited on Individuals' Psychological Restoration and Connectedness to Nature

Kayleigh Wyles ^[1], Mathew White ^[2], Melanie Austen ^[3], Sabine Pahl ^[4], Stephen Herbert ^[5]

^[1] University of Surrey, Great Britain; ^[2] University of Exeter, Great Britain

^[3] Caroline Hattam, Plymouth Marine Laboratory, Great Britain

^[4] University of Plymouth, Great Britain; ^[5] Natural England, Great Britain

Nature is widely recognized as a resource that facilitates various health and well-being benefits, including strengthening an individual's sense of connectedness to nature (their emotional bond to the natural world) and enhancing psychological restoration (e.g., feeling relaxed). However, in previous work nature is often assumed to be homogeneous with different types and levels of quality of natural settings not being distinguished. This secondary data analysis therefore examined whether the extent of these benefits vary according to the environment visited in terms of type (e.g., urban-green, rural-green, & coastal) and quality (e.g., whether the site has a protected designation).

An existing large national dataset was analysed, which holds data on 235,565 English residents who were interviewed throughout the entire year and asked about occasions in the last week when they spent time out of doors as part of the MENE survey (the Monitor of Engagement with the Natural Environment). Of this sample, a sub-sample of participants ($n = 4,515$) provided information on the exact location of their visits, providing detail on the type and quality of the

environment as well as recalling their experiences (such as feeling connected to nature and feeling calm and refreshed). Using regressions and structural equation modelling, we found that participants reported greater recalled connectedness to nature and psychological restoration following visits to rural green and coastal environments compared to urban green settings, and when visiting protected/designated areas (e.g., Sites of Special Scientific Interest). Further analysis examined the interaction between type and quality of the environment. In additional detailed analysis of visits, demographic and visit characteristics were also found to have an influence, e.g. connectedness to nature was higher after spending more than 30 minutes in the environment. This further develops our understanding of the beneficial impacts visiting nature can have, highlighting the mechanisms that may be at play, and emphasising the importance and relevance for environmental management and conservation.

Keywords | Restorative, Attention Restoration Theory, connectedness to nature, blue space



Gardening for Good – Comparing Determinants of Restoration in Domestic and Allotment Gardens

Chris Young, Nicole Bauer

Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Switzerland

The greater positive effect of natural compared to built environments on human restoration and well-being has found empirical support for many years and can be explained e.g. by Attention Restoration Theory and Stress Recovery Theory. In urban areas, where an ever increasing proportion of the world's population lives, private gardens are an important type of natural environment. Yet, a small number of studies examine how gardens and gardening contribute to restoration. Previous studies present evidence for higher health and well-being measures for a sample of older allotment gardeners as opposed to non-gardeners, or show that short-term stress can be reduced significantly by a gardening activity.

For this paper, we compare two types of gardeners, gardeners with allotment gardens ($n \approx 100$) and gardeners with a domestic garden directly adjacent to their home ($n \approx 200$) and examine how the self-reported restoration of these two types of gardeners is related to dimensions of restorativeness of the garden, to the gardeners' values, preferences and social activity. We view gardening holistically, as a set of practices and experiences, including tasks related to maintenance of the garden ('gardening' in a specific sense), passive restoration in the garden and social interaction in the garden.

The data we use was collected in the city of Zurich, Switzerland, with a part mail/part face-to-face standardized survey in summer/autumn 2016 using a

random sample. Respondents report perceived relaxation in the garden, as well as the perceived restorativeness of the garden using a six-item scale based on Hartig et al. We also measure perceived mastery, time autonomy, perceived stress due to obligations the garden entails, a preference for orderly gardens and a number of indicators of social interaction related to the garden.

Our hypotheses concern the differences between the garden types. Allotment gardens differ from domestic gardens among other things in that (1) they are geographically separate from the home, (2) they are generally used by a less affluent population and (3) they are subject to far more formal rules concerning how they are to be managed.

Using descriptive statistics and multiple regression models we examine the hypotheses (1) that a "being-away" dimension has a positive relation to overall restoration, but is stronger for allotment than for domestic gardeners, (2) that mastery and time autonomy display a stronger positive relation to overall restoration for allotment than for domestic gardeners and (3) that the garden is a greater stressor for allotment gardeners.

Our results will contribute to explaining how the different social and physical organisation of garden spaces influences their restorative effects. Insights like these can be used to optimize the positive effects of gardens on individuals and urban areas.

Keywords | Restoration, leisure activities, gardening



Design with Aromatic Plants to Promote Mental Health

Gaochao Zhang

Department of Geosciences and Natural resource management, University of Copenhagen, Denmark

Green spaces have various health benefits on human. However most of the former and present researches aim to assess the overall health benefits of green spaces. This study focuses on the health benefits of an aromatic plant garden and our point is sustained with a combination of evidences from self-reported mental health status and biomarker.

Using aromatic plants in garden dates back to hundreds years ago. In a 16th poem a garden with aromatic plants was described as "It is so sweetly fragrant, it counters disease". How does it work? Recent researches suggested that odours can modulate mood, cognition, emotional behaviour and attention, etc. There are different hypothesis to explain the mechanism of how aromatic plants affect human mental health. From the pharmacological view, some researchers believe that the effects come from odorants' direct and intrinsic ability to interact the autonomic nervous system or endocrine system. Some psychologists believe that the responses to odours of people are obtained from former emotional experiences, and certain odours consequently arouse the associated feelings and emotions. At the same time, the emotional, cognitive and physiological effects were exerted concurrently themselves.

In many laboratory studies, evidences of the health impacts of aromatic plants and their essential oil have been demonstrated. However, the attempts to investigate the health benefits of living aromatic plants in natural outdoor environments are far from being enough. Thus, to determine the influence of aromatic plants on human mental health in a natural, outdoor setting, we designed and constructed a garden with certain assemblage of aromatic plants and made experiments with human volunteers. Locating in

Shanghai, China, this small garden is composed of mainly aromatic plants. Rosemary, Mint, Lemongrass and Rose were selected as functioning plants since our garden is designed to improve human mental health. These aromatic plants are believed to have the efficacy of calming down and reducing mental problems, like anxiety and depression, based on the effects of their essential oils. We conducted experiments using the method of control test. Self-reported scales (SCL-90) and biomarker (S-IgA) from the saliva showed that the mental status of the visitors improved significantly after spending some time in a week long period in the garden. This research provided some valid evidences that a garden with certain assemblage of aromatic plants has the ability to promote the mental health status of the visitors.

I hope this study could inspire us to utilize aromatic plants more consciously in outdoor environments. Certainly, more studies are needed to gain a better understanding of the mechanisms of their health benefits and the different efficacies from different species. What's more, researches in the field of Landscape architecture should put more emphasis on sensitivities like olfaction, sounds and touch. We know little about how they contribute to our health when we are enjoying the nature and we seldom take advantage of them when making therapeutic landscapes. A key issue leading to this imbalance is that we do not have enough quantified and convincing evidences. This is a great obstacle for the future development of our subject.

Keywords | Aromatic plants, therapeutic garden, mental health, efficacy evaluation, scent in landscape



greencare

Wo Menschen aufblühen

International Conference on Landscape and Human Health: Forests, Parks and Green Care

May 17 - 19, 2017, Diplomatic Academy of Vienna, Austria

www.landscapeandhealth.at

Poster Presentations



Contents

Cumulative Diversity Dose CDD as an Integrated Measure of Human Exposure to Biodiversity

Raf Aerts, Michiel Stas, Sander Heylen, An Van Nieuwenhuyse, Marijke Hendrickx, Lucie Hoebeke, Nicolas Dendoncker, Catherine Linard, Sebastien Dujardin, Willem Verstraeten, Andy Delcloo, Rafiq Hamdi, Nell109

Mitigation of Climate Change Effect on Human Health and Well Being through Green Landscapes

Gulshan Ahuja110

Forest and Human Health: A New Approach for Forest Management

Albert Bach Pagès, Josep Peñuelas, Joan Llusà, Teresa Romanillos, Roser Maneja, Martí Boada111

Public Open Spaces, Landscape Design and Mental Well-being: A Literature Review

Martha Battaglin Ramos.....112

The relationship between citizens' wellness and their urban forest attendance habits in Lithuania

Ana Bernat, Vitas Marozas, Remigijus Zalkauskas.....113

Restorative Effects of Blue Spaces on Area Users Depending on the Degree of Naturalness –

A Case Study from Vienna, Austria

Sarah Böhm, Arne Arnberger114

Feel-Good-Trails: Promoting Health through the Establishment of Restorative Trails

David Bröderbauer, Andrea Lichtenecker, Regina Hrbek, Martina Marschnigg, Gerald Plattner115

Walk the Restorative Path!

Renate Cervinka, Markus Schwab116

Mainstreaming Biodiversity into the Health Sector and Society in Austria –

Focus and Activities of the Project "Biodiversity and Health"

Kerstin Friesenbichler, Arne Arnberger, Hans-Peter Hutter, Piero Lercher117

PLANT-DRAW-PAINT:

A Horticultural Therapeutic and Artistical Offer for Very Old, Disoriented People in a Care Home

Christina Holländer118

Forest Pedagogics in Context to Green Care WALD

Elisabeth Johann119

Development of Forest Healing Information System Utilizing Forest and Meteorological Information

Ki Weon Kim, Man Yong Shin, Dong Wook Ko120

Does Clean Air Make You Happy?

Sarah Knight, Peter Howley, Colin McClean121

Local Strategies on Conservation of Urban Biodiversity: Relationships Between the Conservation and Sustainable Urban Forest Management for Quality of Life

Ryo Kohsaka Tohoku, Yuta Uchiyama122

Analysis of Satisfaction in Accordance with the User Characteristics of the Healing Forest

Jeonghee Lee, Jaeyoon Hong.....123



German Forest and Health Professionals' Presumption on Forest Health Benefits and their Cross-sectional Willingness to Cooperate Katharina Meyer, Kerstin Botsch	124
Tourism in the Forest as a Source of Additional Income for Forestry Workers – Polish State Forests Case Study Wiesława Ł. Nowacka, Emilia Janeczko, Alicja Gasek	125
The Alpine Health Region Salzburg – A Government-driven Approach for Evidence-based Health Tourism Christina Pichler, Christian Salletmaier, Leo Bauernberger, Walter Haas, Bernhard Lehofer, Wolfgang Kuhn, Anita Bott, Christian Steckenbauer, Arnulf Hartl	126
Landscape and a Memory for Mental and Spiritual Well-being Janez Pirnat	127
Health and Natural Environment: A Case Study of the Inhabitants and Visitors of the Natural Park of Montseny (Catalonia) Teresa Romanillos, Albert Bach Pagès, Lina Masana, Roser Maneja, Martí Boada	128
Treetop Walks – Access to Green Spaces and a Modern Approach to Social Inclusion Oliver Thassler	129
Analysis on Accessibility of Urban Forest: Towards Enhancement of Well-being in Urban Regions Yuta Uchiyama, Ryo Kohsaka	130
Identifying Landscapes and Ecosystem Services Producing Wellbeing and Health Benefits in Nature-based Tourism Resorts Marja Uusitalo, Rainer Peltola, Vesa Nikula	131
Effect of Forest Bathing on Urinary Oxidative and Anti-oxidative Biomarker Levels Dahong Wang, Tokushi Horike, Masamitsu Miyanaga	132
Urban Agriculture and Health – A Swiss Case Study: The Contribution of Urban Agriculture to the Town's Society and Environment Hans Wydler	133
Health, Social Aspects and the Future Potential of Austrian Forests Ziehaus Leopold	134



Cumulative Diversity Dose CDD as an Integrated Measure of Human Exposure to Biodiversity

**Raf Aerts ^[1,2], Michiel Stas ^[2,3], Sander Heylen ^[2], An Van Nieuwenhuyse ^[1], Marijke Hendrickx ^[4],
Lucie Hoebeke ^[4], Nicolas Dendoncker ^[5], Catherine Linard ^[5], Sebastien Dujardin ^[5],
Willem Verstraeten ^[6], Andy Delcloo ^[6], Rafiq Hamdi ^[6], Nelly Saenen ^[7], Tim Nawrot ^[7],
Jean-Marie Aerts ^[3], Jos Van Orshoven ^[2], Ben Somers ^[2]**

^[1] Belgian Scientific Institute of Public Health (WIV-ISP), Health and Environment Unit, Belgium

^[2] University of Leuven, Division Forest, Nature and Landscape, Belgium

^[3] University of Leuven, Division Animal and Human Health Engineering, Belgium

^[4] Belgian Scientific Institute of Public Health (WIV-ISP), Mycology and Aerobiology Unit, Belgium

^[5] University of Namur, Department of Geography, Belgium

^[6] Royal Meteorological Institute of Belgium, Meteorological and Climatological Research, Belgium

^[7] University Hasselt, Centre for Environmental Sciences, Belgium

There is growing evidence that human health and human well-being are enhanced by exposure to nature and that levels of biodiversity in natural areas or green spaces determine the magnitude of this positive effect. Measures of exposure to biodiversity in these green spaces are needed to quantify the health effects of such green spaces. Earlier studies have demonstrated a positive association between perceived biodiversity, or the subjective level of biodiversity perceived by green space users, and mental health and psychological well-being. For other health aspects, such as respiratory health, objective measures for biodiversity may be more appropriate, as these can be more directly related to variables underlying the health effects, such as allergenic pollen loads. We propose the cumulative diversity dose (CDD), calculated as diversity $\times$ exposure, as a measure for human exposure to biodiversity. Exposure is the temporal component of CDD (time spent in a given green space) and diversity is the spatial component (species richness and species evenness vary between different green spaces). The most intuitive diversity indices are based on species inventory data (e.g. alpha diversity = local diversity or the number of species in a

given green space) or distribution data (e.g. expected diversity = the number of species that can be expected in a given green space with a certain probability, based on models or procedures such as maximum entropy modeling or jackknife resampling), and yield CDDs expressed in species-hours. More complex CDDs can be calculated, for instance when using proxies for biodiversity such as spectral diversity, a property of green spaces that can be assessed by hyperspectral remote sensing and that varies with species and trait diversity of green spaces. As the CDD objectively integrates biodiversity over space and time, we expect that it is a more robust measure for exposure to biodiversity than perceived biodiversity quantified through questionnaires.

The CDD may therefore be a novel indicator suitable for use in biodiversity dose-human health response studies that aim to broaden the evidence base for the benefits of biodiversity on human health and well-being.

Keywords | Biodiversity, dose-response, ecohealth, ecosystem services, human well-being, mobile health



Mitigation of Climate Change Effect on Human Health and Well Being through Green Landscapes

Gulshan Ahuja

Forest development corporation, India

It is a universal fact that life on earth is inconceivable without trees. Human beings as also the animals enjoy the presence of trees in their surroundings for a variety of reasons and understand that their presence is intrinsically beneficial to their physical and mental health. Researchers have, however, explored the harmful effects of trees as well. But the fact remains that the trees have been related with a large number of physical and mental health benefits in humans, which are difficult to quantify. Trees and nature relieve what is called as "Nature deficit disorder" caused by excessive indoor stay with no view of outdoors through windows to look at Nature's bounty. On the bio-chemical, physiological and physical fronts, trees release oxygen and store carbon-dioxide in their wood. Tree leaves intercept sunshine and UV rays and absorb lower-atmosphere ozone and other pollutants.

Several studies have identified a relationship between the green landscapes, environment and health outcomes. Urban Heat Island effect (UHI) was studied in Delhi (Prof. Mohan Manju, 2012) on 30 sites in Delhi by installing temperature and humidity measuring installments. The magnitude of the urban heat island effect was found to be of the order of about 8°C which definitely can induce climate change and associated health threats. A useful correlation has also been found in case of tree loss from emerald ash borer and human mortality on account of cardiovascular and low respiratory disease. This study does not suggest causation but does suggest a link between trees and human health. These findings substantiated that trees and the natural environment provide major public health benefits. They enhance urban sustainability, mitigate climate change and improve human health and well being. As a result

of extensive replacement of natural soils and vegetation with impervious surfaces, cities have warmer and drier climates than their rural counterparts. From a health perspective, urban residents are particularly at risk of suffering heat strokes. Further, street trees have the potential to regulate the air quality by absorbing pollutants and inversing pollutant deposition. Increasing the vegetation density is, therefore, an effective option for mitigating urban heat at local level and also global scale changes in atmospheric composition.

However, the other side of the story also suggests the negative effects of some species of trees if not carefully chosen for urban planting. Under such conditions, a plethora of processes operating at different scales make it very difficult to predict the net effect of urban trees on air quality in a given environment. Some of the ecosystem dis-services associated with urban trees includes emission of Biogenic Volatile Compounds (bVOCs) as a reaction to stress in their environment, such as high temperatures or low water availability. These compounds trap the ozone in the lower atmosphere and act as secondary pollutants. Similarly, exposure to allergenic pollen from trees is the cause of a range of adverse affects our health, including allergic rhinitis, asthma and eczema.

This paper reviews the mitigation of climate change effect on human health and well being through green landscapes. It does suggest a link between trees and human health on the basis of observational studies.

Keywords | Ecosystem, Biogenic volatile compounds, Cardio vascular, Mitigation, Pollutants



Forest and Human Health: A New Approach for Forest Management

Albert Bach Pagès^[1], Josep Peñuelas^[2], Joan Llusà^[2], Teresa Romanillos^[1], Roser Maneja^[1], Martí Boada^[1]

[1] Institute of Environmental Science and Technology (ICTA), Spain

[2] Ecological and Forestry Application Research Centre (CREAF), Spain

Humans are connected to what surrounds them. From the Hippocratic treaty "On air, waters and places" there is evidence of the influence of the environment on our health and well-being. An emerging focus is the potential of forests as a source of health. During recent years, this idea of healing forests, arisen in Japan as *Shinrin Yoku*, has been approached by the scientific community.

Among other features and forest elements, one of the axis of these potential effects on humans' health are the Biogenic Volatile Organic Compounds (BVOCs), as well called phytoncides when referring only to the terpenoids produced by vegetation. These compounds can have different properties which vary from insect-proof to bactericidal, depending on their components, concentrations and proportions.

During last years, several studies have underlined the effects of these compounds on human health. Some of these studies show the anti-inflammatory properties of BVOCs as well as an effect on the immune system among others. Moreover, research is being carried out on the potential effect of these compounds on certain pathologies as for example Alzheimer's disease and certain tumours.

In a research carried out in Japan in 2015, some phytoncides showed great concentrations in forests air and proved to be increased in humans' blood after a forest walk. The results of this research seem to indicate the possible metabolisation of these phytoncides, which underline the importance of this research topic.

Although research has been developed referring to the potential effects on humans' health, few is known about the mechanisms that drive VOC emissions and concentrations in forest air. Studies in this sense are scarce and have been carried out only in north-east Asia where tree species, forest type and abiotic factors influencing BVOCs emission may be different from other parts of the world. In addition, no research has been done on the effect of forest management on BVOCs emissions and concentrations in forest's air. If within the

coming years, priorities change from forest protection and production to forest recreation and healing as some authors showcase, forest management will need a new approach and data to support it.

In this sense, the current project aims to analyse the relations between forest structure and BVOCs emissions and concentrations. The main goal of this project is therefore to characterise the BVOCs air concentration in different forest types under different management regimes.

The project will be conducted in Montseny, a natural area approximately 50km north-east from Barcelona. Within this area, 6 different forest types will be sampled: Evergreen forest, Oak forest, Beech forest, Cork oak forest, Coniferous forest, and one mix formations.

The forest variables chosen to be studied in this project are those that are thought to potentially effect the BVOCs emissions and air concentrations in woodlands: tree density, diameter and height; vegetation covers and layers; and dominant species. Furthermore, abiotic variables such as temperature, wind speed and humidity will be as well monitored. The forest characterisation is going to be performed in circular plots of 50 meters of radius. The central point of the plot will be the same point where the forest air sample is going to be taken.

Regarding the air sampling, this will be conducted at all different forest types, close to walking paths and at a regular height of 1,6 meters. Forest air is going to be absorbed by solid phase micro-extraction technique (SPME) and characterised by Gas Chromatography-Mass Spectrometry (GC-MS).

The current project starts on March 2017.

This research is going to be possible thanks to the funding from „la Caixa" Banking Foundation.

Keywords | Biogenic Volatile Organic Compounds, Forest air, Forest management



Public Open Spaces, Landscape Design and Mental Well-being: A Literature Review

Martha Battaglin Ramos

University of Florida, USA

Mental well-being has become one of the major forces that guide the design of urban landscapes. Providing respite from everyday stressors to inhabitants of dense urban environments is a challenge for landscape architects designing urban landscapes. Identifying methodological approaches employed to interpret the human experience in the landscape, as well as the theories that explain restoration of human mental capacities, can better inform landscape architects on how to design high performance restorative landscapes in urban settings to support and promote human mental well-being. However, systematic reviews that specifically address how human-environment interactions take place in everyday urban environments remain relatively unexplored. Therefore, this work reviews the academic literature that addresses the human experience with nature in urban settings. In addition, this review identifies theoretical approaches and research methods used in most current research. Searches in the databases Avery Index, Academic Search Premier, Science Direct, Web of Science, and PubMed revealed 25 studies that fit the aim of this systematic literature review. Findings from these studies indicate that the theoretical frameworks Attention Restoration Theory (ART), Affordance Theory, Stress Reduction Theory (SRT), and

Biophilia are adopted to guide relevant research design. The preferred data collection tools are self-report assessments via questionnaire response addressing preference (mostly visual), sense of comfort, anatomy, perception of place, cognitive and affective responses to the environment, meaning, supportiveness and cultural aspects. Overall, the theoretical frameworks and methods of data collection described by the studies point to a reductionist view of the human experience with natural environments. However, even though it is useful to determine components of the landscapes that provide restoration, it remains unclear how such elements should be combined to create optimized restorative landscapes. Such methodological shortcomings derived from this reductionist point of view suggest that a more comprehensive and holistic approach for the measurement of the human experience with nature should be considered to assist landscape architects in fostering well-being in outdoor urban public open spaces.

Keywords | Environmental design, landscape architecture, research methodology, urban settings, well-being



The relationship between citizens' wellness and their urban forest attendance habits in Lithuania

Ana Bernat, Vitas Marozas, Remigijus Zalkauskas

Aleksandras Stulginskis University, Lithuania

Today about 10 % of the territory of Lithuania is occupied by the rapidly expanding urban landscape (Environmental Protection Agency, 2015). In Lithuania, urban territories are frequently expanded by reducing the surrounding green spaces. However, urban forests and parks are an important foundation of quality of human life. It forms a healthy and aesthetic environment, improves the composition of air, affects the urban climate. A number of studies have shown that the natural environment has a positive impact on people's health, well-being and physical activity, and creates favourable conditions for the residents. Urban forestry research is a relatively new and relevant field in Lithuania.

The aim of the study is to investigate the opinion of the visitors of urban forests and to determine the relation between urban forest attendance, time spent in the forest and the wellness of the city dwellers based on the Lithuanian example. The study presents results from questionnaire data collected from October 2015 to April 2016 (more than 500 respondents) in the Lithuanian surveys web-portal www.apklausa.lt. More than 60% of respondents were the residents of the two largest Lithuanian cities, Vilnius and Kaunas. 65% of respondents were females, 35% were males. The survey reveals that the age of the majority of respondents varied from 21 to 40. Chi-square test was applied to determine differences in the frequency distributions of replies between the groups of respondents. Multivariate analysis methods were applied to identify relations between urban forest attendance and dwellers' wellness. The survey showed that the jobs of half of respondents were sedentary. During the summer, about 25% of respondents visited urban forests 4 times a week or more often. In winter, visits to forests decreased to one

time a month. The dwellers spent averagely 1–3 hours in the forest during one visit. The results showed that 16% of respondents felt stress, fatigue, and could not sleep well almost every day. About 14% of respondents were in a bad mood or felt distracted at least once a week. The link between residents' wellness and urban forest attendance was established.

The residents who visited urban forests and parks on working days, weekends and public holidays were in better health than those who did not visit green spaces on a regular basis. 25% of the respondents who visited urban forests irregularly were in a bad mood, felt stress, anxiety, and had headaches almost every day. Only 7% of respondents who were regular visitors of urban forests complained of such symptoms. About 20% of the respondents who did not visit urban forests and parks on a regular basis felt tired almost every day, whereas 10 % of respondents indicated that they had trouble falling asleep or could not have a good night's sleep. The residents who visited urban forests regularly felt less tired and only 2% of respondents indicated having trouble having a good sleep. The study showed that regular visits to urban forests and parks contributed to improved memory. More than 18% of respondents who were not regular visitors of urban parks indicated that they would forget to do something important at least once a week, whereas only 5% of regular visitors of urban forests indicated likewise. It was observed that regular visits (on workdays, weekends, public holidays) to urban forests and parks were related to the reduced risk of catching a cold throughout the year.

Keywords | Questionnaire survey, urban forests, citizen's wellness



Restorative Effects of Blue Spaces on Area Users Depending on the Degree of Naturalness – A Case Study from Vienna, Austria

Sarah Böhm, Arne Arnberger

Institute of Landscape Development, Recreation and Conservation Planning, University of Natural Resources and Life Sciences Vienna, Austria

Natural environments have a large potential for outdoor recreation and positive effects on human health and well-being. Blue spaces, landscapes dominated by water bodies, can have a stress-reducing effect, however knowledge on their health effects on human is largely missing and studies comparing the restorative effects of blue spaces with varying degrees of naturalness are rare. This study explored whether outdoor public swimming sites have a restorative effect on area users and whether there are differences in health perceptions between more or less natural sites. The analysis also included potential factors that may affect restoration such as perceptions of disturbances, place attachment, affinity to nature, perceived crowding etc. In total, 431 on-site visitors (response rate = 73 %) of four swimming sites in Vienna with varying degrees of naturalness were asked by a

standardized questionnaire about their subjective well-being, perceived restorativeness (PRS) and landscape perceptions. The results of ANOVAs confirm the restorative effect of the swimming sites, whereas natural sites evoked a stronger perceived recovery than nature-distant ones, although less natural sites had a positive effect on subjective well-being. The visitors at the more natural sites reported higher affinity to nature and place attachment. Crowding had no influence on the subjective well-being but increased the perception of chaos, disturbance and confusion at the swimming sites. Research and management implications will be presented.

Keywords | Affinity to nature, degrees of naturalness, perceived restorativeness, (urban) blue space, well-being



Feel-Good-Trails: Promoting Health through the Establishment of Restorative Trails

David Bröderbauer^[1], Andrea Lichtenecker^[1], Regina Hrbek^[1], Martina Marschnigg^[2], Gerald Plattner^[2]

^[1] Naturefriends International, Austria

^[2] Austrian Federal Forests, Austria

Hiking as a mean of actively experiencing nature has a positive impact on physical, mental and social wellbeing. While the physical benefits of outdoor recreation are well known and often promoted along hiking trails, the value of nature experience for mental and social health is less often communicated.

In their joint campaign 'WohlfühlWege' (Feel-Good-Trails), the Naturefriends and Austrian Federal Forests (ÖBf) promote the beneficial effects of hiking with an emphasis on mental and social wellbeing. The campaign highlights trails that are accessible for people of different age and physical constitution with the goal to create an offer for target groups for whom challenging hiking tours are beyond reach. The trails are promoted via a website that contains trail descriptions as well as descriptions of recreational exercises and outdoor games.

In order to select proper trails, a set of criteria was developed, based on the requirements of the various target groups, such as people with mobility impairments, parents with baby buggies and small children (< 10 years). Criteria include distance (< 5km), altitude difference (< 500m), inclination (ideally < 6%), flooring (compact and even ground) and accessible infrastructure. All information is presented on the website, so hikers themselves can decide whether a trail fulfils their

requirements or not. In addition to the above mentioned criteria, parameters for the restorative value of the trails such as the structure of the landscape or the presence of viewpoints and water bodies are taken into account.

The trail characteristics are recorded for each trail during an inspection in situ. Moreover, the route is tracked with GPS. These tracks are made available as a download at the website. Subsequently, various stops with signposts are established along the trail. At this stops, relaxation exercises targeting adults are offered along with games for children and information on natural history. Exercises and games emphasize the interaction with nature and aim to reduce stress, foster awareness and stimulate curiosity for the unique features of the landscapes in which the Feel-Good-Trails are embedded. The exercises and information are accessible for smartphone users via QR-codes on the signposts.

So far, three Feel-Good-Trails have been established. In 2017, further trails will be implemented. We aim to create a network of Feel-Good-Trails all over Austria within the next years, offering hiking and nature experience for all people.

Keywords | Hiking, mental health, trails, wellbeing



Walk the Restorative Path!

Renate Cervinka, Markus Schwab

University College for Agrarian and Environmental Pedagogy, Austria

Living conditions and lifestyle of people in urbanized areas have dramatically changed. Diverse stressors act as threat to human health and well-being. Nowadays, the population suffers from stress-related illnesses and civilization diseases. In order to support positive coping with stress it seems necessary to provide affordable health services for the public. During recent years a considerable amount of research showed the beneficial effects of nature on health and well-being. Even short stays in nature result in an increase of positive affect. Further, nature promotes physical activity, development of self, social inclusion, and child development. In this project we defined a restorative trail as a trail connecting places scoring high on restorativeness.

Three consecutive studies, together with 93 student-researchers in total (53 % female), analysed the restorative potential of selected places in (1) a national park, (2) a nature reserve, and (3) a palace garden. To measure the restorative potential we applied a 26-item version of the Perceived Restorativeness Scale (PRS: Hartig et al, 1997) in German language at different places visited during guided walks. Additionally, we measured connectedness with nature, connectedness with the location, and mindfulness together with socio-demographic data. All sites in nature scored high on perceived restorativeness (above 5,5 on the 11-point scale). Places with a forest appearance regularly reached scores above 6. However, values differed significantly.

Pre-post comparisons of both forms of connectedness, and mindfulness showed significant increases post visit.

In these studies we assessed the restorative potential of different locations in using a scientific approach. In practice, so called „power places“ often are identified in using scientifically unproved approaches like witching. In order to provide nature-assisted interventions for health promotion or nature-assisted therapy at health-supporting places, we advocate performing these activities in scientifically evaluated environments. Additionally, we demonstrated the rise of connectedness and mindfulness during guided walks in environments rich in verdure. We discuss connectedness with nature and mindfulness as powerful personal resources in stress coping. Attending stress-relieving activities at such sites people may profit in two ways: first, in experiencing restoration in places fostering health and well-being; second, in profiting from the special intervention designed to facilitate coping with stress. We suggest walking restorative trails connecting places high on perceived restorativeness for health promotion. Informative material may help people to profit from recent findings on the beneficial effects of nature on health and well-being. Evaluation studies should assess intended health related effects in future.

Keywords | Certification, Green Care, Health Promotion, Public health, recreation



Mainstreaming Biodiversity into the Health Sector and Society in Austria – Focus and Activities of the Project “Biodiversity and Health”

Kerstin Friesenbichler^[1], Arne Arnberger^[2], Hans-Peter Hutter^[3], Piero Lercher^[4]

^[1] Umweltdachverband, Austria

^[2] University of Natural Resources and Life Sciences Vienna, Austria

^[3] Medical University Vienna, Austria; International Society of Doctors for the Environment - Austrian section, Austria

^[4] Austrian Medical Chamber, Vienna; Medical University Vienna, Austria

The Austrian initiative “Biodiversity and health” started in 2012 as a project led by the Umweltdachverband (Austrian NGO and environmental umbrella organization) in cooperation with several partners with the aim of raising awareness for the benefits of biodiversity and nature for health and human wellbeing. By pointing out to the correlations and relationships between biodiversity and health aspects, the attention of decision-makers and the general public is drawn to the intrinsic value of unspoilt ecosystems, landscapes and services they provide for free. The aim is to promote acceptance and commitment for the conservation of biodiversity in order to facilitate achieving the national biodiversity goals along with the Biodiversity Strategy Austria 2020+.

Another objective is to bring together the various stakeholders across all relevant sectors in order to enable mutual regard for their interests and to integrate biodiversity conservation in other sectoral policies. A **“biodiversity and health” forum** was established in 2015 as a cross-sectoral platform with the goal of mainstreaming issues of biodiversity conservation into other sectors, also in the sense of health promotion. Stakeholders of various fields such as science, nature conservation, health, medicine, psychology, education as well as representatives from authorities participated. The forum meets annually and discusses priorities for cross-sectoral collaboration and possibilities on how to engage the general public. As an outcome, an **action plan** has been drafted with the active support of the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management. The action plan includes recommendations for measures relating to the promotion of biodiversity conservation linked to its various benefits for the health sector as well as other parts of society.

Another important part of our project is to inform as many people as possible about this complex issue and to encourage them to include actions for biodiversity conservation in their daily life. This was realized by producing an animated **short video** which explains biodiversity and its benefits for health and wellbeing (www.youtube.com/watch?v=oZrcDh2NA4s). The message of the short video is easy to understand. It is suitable for introducing people to the topic and for visualising the multiple associations of biodiversity and health. Furthermore, a **book** “Good for you and me. How Biodiversity promotes our health” (German) was published to enable a more detailed look at this complex relationship. The book draws attention to various aspects, such as the value of species richness for the development of medicinal products, the importance of contact with nature for children and their development, the opportunities to recover and relax in natural areas, and the role of ecosystem services in providing clean air and water.

In summary, the project “Biodiversity and health” contributes in various ways to the facilitation of interdisciplinary communication and to the integration of biodiversity protection and connected aspects of health and well-being into other sectoral policies.

“Biodiversity and health” is a project funded within the campaign **vielfaltleben** by the Austrian Federal Ministry of Agriculture, Forestry, Environment and Water Management (BMLFUW) and the European Union.

Keywords | Biodiversity, mainstreaming, awareness-raising, cross-sector platform



PLANT-DRAW-PAINT: A Horticultural Therapeutic and Artistical Offer for Very Old, Disoriented People in a Care Home

Christina Holländer

Austria

In his book „Medical Inquiries and Observations on the Diseases of the Mind“ the American physician *Benjamin Rush* (1745-1813) recommends gardening as a cure for depression and anxiety as well as preventing self-neglect (Schneider-Ulmann 2010). Starting from Great Britain and the United States of America horticultural therapy has been established in Europe in the beginning of the 19th century. Various effects on the emotional and physical wellbeing and human health by gardening have been observed in different studies (Kaplan 1973, Ulrich 1999, Sempik et al. 2003, Kuo 2004, Arrott and Gigliotti 2004, Strohmeier 2010, Putz 2010). *Waliczek et al. 2005* compared the perception of life satisfaction of gardeners with non-gardeners. The personal assessment of energy, optimism, zest for life and the physical self-concept of gardeners were more positive than in the comparison group.

Making use of synergies between horticultural therapy and other therapeutic directions like art therapy have been rare so far. An innovative approach integrating horticultural therapeutic and artistic methods is the offer “PLANT-DRAW-PAINT” (Holländer 2016). It has been created and empirically researched over the last 4 years, and feedback from clients, family members and nursing staff has been collected too. Feasibility and acceptance of this multiprofessional therapeutic concept are summed up in words and pictures in the book “Pflanzen Darstellungen im Jahres Rhythmus” published in July 2016.

In a care home for very old and confused inhabitants, objects of nature were regularly brought to the clients

by the horticultural therapist, in some cases even to their bedsides, with the aim of stimulating their senses. The plants perceived through their colours, shapes, haptics and smell were ambassadors for the tradition of “*nature in people*”(Holländer 2016, foreword), causing interest and curiosity and awakening latent experiences and positive emotions. The inner images conjured up, and not only stayed in their minds as memories but also were expressed by the clients through the act of painting. According to observations the experience had ongoing positive effects on these very old, disoriented people - including more awareness and attentiveness, an improved appetite, less pain and a more peaceful sleep. Improvements in creative and verbal expression, craft skills, decision making, long-term memory and social interaction could be observed too (Holländer 2016).

Conclusion

PLANT-DRAW-PAINT enables art and creativity to grow in the horticultural therapeutic process with very old, disoriented people in a care home initiated by the contact with nature, visible for all, and makes communication possible without words.

Keywords | horticultural therapy, dementia, plant, draw, paint, green care, art

References

- Arrott, S.E., Gigliotti, C. (2004). From the Garden to the Table: Evaluation of a dementia-specific HT programm. In: Relf, D. (2004). A preceedings of the XXVI. International Horticultural Congress. Acta Horticulturæ 639, 139-144.
- Holländer, C. (2016): Pflanzen Darstellungen im Jahres Rhythmus (1. Auflage). Vienna.
- Kaplan, R. (1973). Some psychological benefits of gardening. *Environment and Behaviour* 6, 1, 145-161.
- Rush, B. (1812). *Medical Inquiries and Observations upon the Diseases of the Mind*. Philadelphia: Kimber & Richardson.
- Sempik, J., Aldridge, J. & Becker, S. (2003). *Social and Therapeutic Horticulture: Evidence and Messages from Research*. Thrive and CCFR. Media Services Loughborough University.
- Ulrich, R.S. (1999). Effect of gardens on health outcomes: Theory and research. In: Marcus, C.C. & Barnes, M. (Eds.). *Healing Gardens: Therapeutic Benefits and Design Recommendations*. New York: John Wiley and Sons.



Forest Pedagogics in Context to Green Care WALD

Elisabeth Johann

Association Forest Pedagogics in Austria, Austria

Until the 1980s almost unknown forest pedagogics has gained increasingly importance within the last two decades. Forest pedagogics in the modern sense means to experience nature and to perceive forest and nature with all senses. Forest education plays with rest and movement, invites to undertake voyages of discovery and raises awareness related to the multiple services deriving from forests. The overall goal is to build up an emotional relationship to forests (from head to heart) as well as to give subject-orientated information about the interdependencies, the long-term development and complexity of forest ecosystems. Target groups are visitors of all age, mainly children and youngsters, however also adults and seniors are increasingly included. Today there are a variety of diverse nature- and forest-related educational initiatives that contribute to health and well-being in a broad sense and have to do with forests or trees.

Nowadays, numerous research papers emphasize the importance which is attached to the forest as a recreation, experience and learning space. Forest and trees enjoy a high priority in our society. People are happy in this natural space, which is regarded as the epitome of the natural. Some of the most interesting evidence of the health benefits of nature is coming out of Japan, and revolves around the popular practice of "Shinrin-yoku" or "forest bathing". The practice was introduced in 1982 by the Forest Agency of Japan to encourage a healthy lifestyle and decrease stress levels.

Due to social developments, the demand for additional services has arisen within the last years. Studies indicate that the forest unfolds its diverse health effects best if its visitors are accompanied in a perfect way. Forest pedagogues have therefore extended their offers as well as the target groups. Due to their education and after an appropriate professional training, forest pedagogues are well equipped to cover this demand to a high degree. New programs are targeting on the health

effects of the stay in the nature, in particular in the forest. Thus, interesting connections arise to the activities and programs that currently are grouped together under the term Green Care WALD. It is a bundling of initiatives and activities from science and practice, which in the long run help to improve the well-being of the society with the help of the forest. It comprises among others the health effects deriving from the stay in the forest.

The study is based on the experience of about 800 forest pedagogues organized in the "Association of Forest Pedagogy in Austria" founded in 2002. As the extended and frequent stay in the forest is an option to contribute sustainably to the health and well-being of the entire population, the project of establishing a lifelong relationship between human beings and forests has been developed by forest pedagogues. It is based on a variety of offers modified to the particular demands of a specific age- and target-groups. The aim of this study is to publicize the diverse natural and forest-pedagogical projects and initiatives which have to do with trees and forests offered in Austria up to now and contribute to human health and well-being of the population in a broad sense. The paper will present examples of good practises such as guided tours for children, youngsters, adults with health problems, handicapped people and seniors as well as forest schools and forest kindergarten. It will also present successful results of cooperation between forest pedagogues and medical doctors and therapists concerning for instance rehabilitation, violence and drug prevention. Thus, the paper intends to inspire visions, how additional offers either alone or in cooperation with other institutions can be developed.

Keywords | forest pedagogics, guided tours, education, partnership, human health



Development of Forest Healing Information System Utilizing Forest and Meteorological Information

Ki Weon Kim, Man Yong Shin, Dong Wook Ko

Kookmin University, Republic of Korea

Problem statement

• Problems

Increasing stress and lack of natural experiences in modern society have led to strong needs for well-being and healing opportunities. The lifestyle for increased quality of life is surfacing, especially that reduces stress and emphasizes both mental and physical health. In Korea, the demand for forest recreation and healing is extremely high. However, activities are limited to simply visiting recreational and healing forest facilities, without appropriate information on forest healing.

This limitation is related to the lack of research on the effects of forest recreation and forest healing. Most literatures fail to provide specific benefits from forests with distinct characteristics. Information on forest properties and healing potentials will help visitors decide which forest healing facilities to visit to maximize benefits.

• Purpose

One of the most useful information is the location of forest healing facilities and their healing potential and purposes. Such information will greatly simplify users' decision on which facility to visit, and how to access. The objective of this project is to 1) develop and evaluate a healing index on forest healing potentials based on meaningful forest and weather/meteorological variables, and 2) develop a web-based system to deliver such information to public users. The delivery system will be similar to weather-cast systems for easy access and use.

Methods

Several steps are proposed for the development of forest healing information system (FHIS):

- Forest healing Index based on forest healing variables
From the comprehensive list of variables select important ones with important healing impact
- Evaluate healing potential of recreational forest areas with forest healing index
- Develop web-based forest healing information system for public access using forest healing index

Major results

- Initial selection of comprehensive variables: forest, topography, visual (aesthetics), meteorology, physiology and chemistry
- Forest healing Index will be developed after selection of main variables based on expert opinion and Delphi survey method
- Evaluate forest healing potential of recreational areas and classification of results (3- to 10-level scale)
- Forest Healing Information system will be developed that utilizes free-access public data

Conclusion and expectation

The final outcome of this project is to develop a free web-based information to provide a forest healing potential index of forest healing facilities. Forest healing potential will be represented through a forest healing index, which is estimated based on forest characteristics, climate/meteorology, facility accessibility and forest physiological properties of forest healing facilities. In particular, the delivery system will provide relevant information of individual forest healing facilities and their spatial locations.

Keywords | Forest healing, meteorological factor, forest healing index, forest healing potential, forest healing forecasting



Does Clean Air Make You Happy?

Sarah Knight, Peter Howley, Colin McClean

Environment Department, University of York, United Kingdom

Improving human health and well-being is a governmental priority globally. The World Health Organisation defines health as a “state of complete physical, mental and social well-being and not merely the absence of disease”. Recent literature shows that the quality of the natural environment and interactions with it are beneficial for human health and well-being. According to the European Environmental Agency, air pollution from industry costs Britain £3.4bn-£9.5bn a year in health and environmental damage. In a study commissioned by the Mayor of London in 2015, researchers at Kings College London found that in London alone an estimated 9,500 early deaths are caused by exposure to air pollution each year. Despite the UK meeting EU targets regarding the level of a number of air pollutants, it regularly exceeds one or more of these limits, signalling a need for increased regulation and awareness of air pollution issues to reduce the economic and health burden of air pollution in the UK.

This project examines the relative contribution of environmental quality, specifically air quality, on self-reported quality of life. Indicators of well-being in the

British Household Panel Survey (BHPS) and Understanding Society were spatially linked with detailed UK air pollution records held by the UK Department for Environment, Food and Rural Affairs (Defra). These historical records hold ambient annual nitrogen dioxide levels for the UK between 2002 and 2014. Econometric analysis was then employed to identify the effect of air quality on subjective well-being, accounting for social and economic factors and greenspace allocation. A fixed effects approach was used to benefit from the longitudinal well-being data. Early results indicate that pollution has a negative impact on subjective and objective well-being. This has significance for health, well-being and environmental policy-making both in urban and rural areas, and contributes to the environmental quality and greenspace literature regarding the impacts of nature on human well-being. This approach has the potential to highlight geographies and/or demographics that are more affected by changes in their physical and ecological environment.

Keywords | Air quality, pollution, nature, well-being, happiness



Local Strategies on Conservation of Urban Biodiversity: Relationships Between the Conservation and Sustainable Urban Forest Management for Quality of Life

Ryo Kohsaka Tohoku, Yuta Uchiyama

University, Japan

In the activities of conservation of urban biodiversity and related urban forest management, local municipalities try to facilitate monitoring of biodiversity and ecosystem services, a participatory approach including stakeholders for the conservation. In those activities, implementation of participatory monitoring and development of networks of stakeholders are included. The issues, approaches and motivations of local municipalities differ depending on their attributes including environmental resources, population size and budgets. However, the relationships among those attributes and characteristics of the conservation activities are not fully identified. An effective knowledge and information sharing can be implemented among municipalities with similar relationships among their attributes and activities. In this research, surveys of major Japanese cities are implemented, and those cities are categorized by their attributes and conservation activities. As a result, typologies of cities with similar characteristics of urban forest managements for quality of life are being identified.

In urban biodiversity conservation, multiple sections in municipalities need to collaborate to implement conservation policy and activity, because municipalities have districts with different ecosystems, and various sections including urban planning, education, and industry promotion sections can collaborate in conservation and maintenance of urban biodiversity. For example, municipalities characterized by agriculture lands have collaboration between environmental

management sections and agricultural promotion sections. In case of municipalities with relatively high rate of forest lands, they have needs to focus on forest lands to maintain their biodiversity by collaboration between forest management sections and general environmental management sections. Sectionalism is an issue to be solved in collaboration among different sections in biodiversity conservation. In this context, elaborating biodiversity conservation strategies at a municipality level can provide opportunities to tackle the issue, through facilitating communication among different sections.

In addition to collaboration among different sections in municipalities, keeping their budgets of biodiversity conservation is another serious issue. The budget can be largely changed in most of municipalities, because the priority of biodiversity conservation is not highly comparable with other policies including promotion of municipal industries. In those municipalities, the fact of the contribution of the conservation policies and activities are overlooked. The conservation can contribute to maintenance and development of the fundamental environment of industries, and to enhance amenity and quality of life for the residents. Environmental education of municipal staff and residents and participatory monitoring of ecosystems in municipalities can contribute to improve that situation.

Keywords | Urban biodiversity, urban forest, municipality, quality of life, participatory approach



Analysis of Satisfaction in Accordance with the User Characteristics of the Healing Forest

Jeonghee Lee, Jaeyoon Hong

National Institute of Forest Science, Republic of Korea

This study analyzed the satisfaction level in accordance with the user characteristics by conducting a satisfaction level survey. This study aimed at people, who participated in the forest healing program at three National Healing Forests in South Korea. As of September 2016, there are seven Healing Forests in operation since the first Healing Forest at Saneum opened in 2010. Additional 34 Healing Forests are under construction or being planned. Forest therapy is defined as activities to increase the body's immunity and enhance the health by using various elements of nature (e.g. fragrance and landscape) (Forestry Culture and Recreation Act article under Article 2 and Item 4). A government organization has actively created Healing Forests and Forest Healing Camps to invigorate forest therapy. Healing Forests run the forest healing program developed by forest healing instructors, who are nationally licensed experts. As more South Koreans are interested in health and welfare, people visiting Healing Forests are continuously increasing. Therefore, it is required to develop programs specialized for each region and run marketing in accordance with them. This study analyzed the user characteristics and the degree of satisfaction of people, who participated in Saneum, CheongTae-san [MT], and Jangseong National Forest Healing Programs. From the results, this study made several suggestions to run these forests better.

A face-to-face satisfaction survey was conducted to the users of Saneum, CheongTae-san [MT], and Jangseong Forests Healing Programs between March and October 2016. Among the questions to evaluate the characteristics and satisfaction of users, multiple-choice type questions consist of 'single answer' and 'multiple answers' types. Questions to estimate the user's satisfaction were evaluated by using the Likert scale (maximum 5 points).

Sociodemographic characteristic results showed that majority (31.0 %) of people, who used the Forest Healing Program in healing forests, were in the 40s. People in the 50s were the second most frequent (29.5 %) user age class. People living in Seoul and Gyeonggi-do were the main users of Saneum and CheongTae-san [MT] Healing Forests, while those living in Gwangju and Jeonbuk were the main users of Jangseong Healing Forest. Results showed that the majority of the participants lived within 1 hour and 30 minutes driving distance. Results also indicated that 25.6 % of participants suffered from a disease.

Age, health condition, and the means of transportation were the most important factors (in the order of a magnitude) affecting the user satisfaction. People in their 40s and 50s expressed the highest satisfaction. The analysis on the usage characteristics revealed that the experience of a visit, the objective of a visit, and the duration of a visit were important factors in the order of a magnitude. People, who previously experienced a Healing Forest had a high satisfaction. In the aspect of the objective of a visit, the degree of satisfaction was in the order of self-examination > refreshment/rest > health promotion. People, who stayed between 90 and 120 minutes, showed the highest satisfaction ($p < .05$).

The results of this study suggested two plans for improving the operation of Healing Forests. First, it is required to develop programs differentiated by the age of users (e.g. age and health condition). Second, it is necessary to develop programs meeting the usage characteristics (e.g. the objective of a visit and the experience of a visit).

Keywords | Forest visitor, forest healing program, forest therapy, forest healing camp



German Forest and Health Professionals' Presumption on Forest Health Benefits and their Cross-sectional Willingness to Cooperate

Katharina Meyer^[1], Kerstin Botsch^[2]

^[1] University of Göttingen, Forest faculty, Chair of Nature Conservation and Landscape Management, Germany

^[2] Black Forest National Park, Germany

Introduction

There are indications showing that forest exposures have health benefits. How can these positive effects be implemented into practice? This depends on the knowledge and attitude concerning the health benefits of the stakeholders, working in the different industries, the health and the forestry sector. An important role plays their willingness to step into a cross sectional cooperation. Hence, in a pilot study guideline interviews with German forest and health professionals and professionals standing in-between these both professions were conducted.

Method

An interview guideline was developed. It was designed to determine whether the professionals presume forests have positive effects on health. It included open theme-centered questions on health benefits of forest exposures. At the end of the interview a thought experiment was performed to derive the willingness of the involved parties to cooperate across the industries. Several forest departments, non-governmental forest organisations, nature parks, public health departments, private medical practices and physiotherapists were contacted and asked to participate. Professionals were chosen and interviews were taken in 2014/2015. All interviews were digitally recorded and transcribed (f4) for analysis reasons. For analysis Mayring's qualitative content analysis was applied. It offered the opportunity to profit from deductive theory given reflections and from inductive views for additional positions. Mayring's content analysis works with a (deductive) category system which had to be developed to interpret the interviews. Furthermore, a frequency analysis (MaxQDA) was done.

Results

The level of presumption concerning the health benefits of forest exposures ranged from middle to strong amongst most professionals. The group of health professionals showed the highest presumption. Moreover, most of the professionals gave the impression to be willing to have a cross sectional cooperation. The willingness to cooperate was highest in the forest professional group.

Discussion

One reason for the level of presumption might be the common knowledge on the positive effects of nature contact in general. An explanation for the higher presumption level in the group of health professionals might be the higher probability to be able to access research findings on positive effects of forest exposures on medical platforms. The relatively high willingness to cooperate in the group of forest professionals is explained by the latest developments in the German forest sector.

Conclusion

Forest and health professionals presume that forest exposures have health benefits. Further both groups seem to be open minded for a cross sectional cooperation.

Keywords | forest health benefits, forest exposure, forest and health professionals, guideline interviews



Tourism in the Forest as a Source of Additional Income for Forestry Workers - Polish State Forests Case Study

Wiesława Ł. Nowacka, Emilia Janeczko, Alicja Gasek

Warsaw University of Life Sciences, Faculty of Forestry, Department of Forest Utilisation, Poland

Forests in Poland have always performed a great number of different functions essential for human existence. The primary function of forests was to guarantee production of wood as an important source for people's other activities. The economic function of forest resources is still very important, even though using forests for purposes other than wood production is increasing. Contemporary societies more often emphasize the increasing role of human needs and expectations regarding health and leisure activity.

Polish forestry is now implementing the principles of sustainable management in all parts of its activities. The contemporary concept of sustainable and balanced development of forests (SFM– Sustainable Forest Management) is based on the management and use of forests and forest areas in a manner and at a rate ensuring the preservation of their social potential in a long run. The relevance of social aspects, including health, was highlighted in the declarations and resolutions adopted at the Ministerial Conferences on the Protection of Forests in Europe (MCPF E), convened in Helsinki in 1993, in Lisbon in 1998 and strengthened in Vienna 2003. Last years' MCPFE meeting in Madrid acknowledged that forests are a source of employment with great potential to generate jobs and income opportunities also through new forest products and services as well as to contribute to rural development, human well-being and social equity.

Forestry has long been associated with recreation and tourism. The importance of forests for recreation grows as the population grows. Visitors enjoy forests and the wide range of activities that can be fulfilled in forests. There are lots of activities to do in the forest: camping, hiking, photography, collecting cones, mushroom picking, wild berries and other forest fruits

picking, herbs gathering, horse riding, listening to birds, climbing trees, and creature identification.

It should be emphasized that some kind of tourism activity could be very hazardous to the forest environment and should be avoided, e.g. any activity done during the nesting season around nests of rare or endangered bird species.

The list of forest tourism base in Poland includes more than 3,000 objects and places. There are objects performing following functions: training and recreation centre, hunting lodge, guest rooms, camping places, educational facilities and museum, educational paths, fire places, and parking places.

The aim of this study is to assess the involvement of forest workers living nearby forests as touristic operators. It is also to illustrate the potential contribution of forestry-based tourism to rural development. For this purpose, a standardized questionnaire was used to possess data from local community members. Results of last decade investigations with more than one thousands of filled in questionnaires are presented herein. 10% of the interviewed persons are leading their agro-touristic businesses longer than 5 years. They evaluate the business as a stable activity and financially efficient. There were done 20 direct interviews with forest touristic operators, as well as more than 50 telephone interviews too. Most interviewed persons are not economically dependent on the work in tourism, which is mainly conducted in their leisure time, especially during summer time. In the opinion of respondents being a touristic operator is challenging but they are optimists – they believe their chances of success are good.

Keywords | Forestry, local communities, tourism, recreation, services



The Alpine Health Region Salzburg – A Government-driven Approach for Evidence-based Health Tourism

Christina Pichler^[1], Christian Salletmaier^[2], Leo Bauernberger^[3], Walter Haas^[4], Bernhard Lehofer^[4],
Wolfgang Kuhn^[3], Anita Bott^[3], Christian Steckenbauer^[5], Arnulf Hartl^[1]

^[1] Paracelsus Medical University Salzburg, Institute of Ecomedicine, Austria

^[2] Land Salzburg, Regional Development and EU Regional Policy, Austria

^[3] SLTG SalzburgerLand Tourismus Gesellschaft m.b.H., Austria

^[4] ITG Innovations- und Technologietransfer Salzburg GmbH, Austria

^[5] IMC Fachhochschule Krems, Austria

Our modern urban societies increase the need for recreation and preference for nature. Outdoor recreation in natural environments is well on the way to becoming an important element of a healthy living and a remedy against the deficiencies of an urban life separated from nature. Therefore, health tourism built on natural resources is seen as a growth driver within the tourism industry and an increasing number of tourism destinations are positioning themselves as health regions in order to attract health-conscious customers.

Although, the enormous proliferation of health tourism products within the last years led to a negligence of quality and evidence indicators. Outcomes concerning health have rarely been evaluated according to criteria of evidence-based medicine. As the essential product truth is missing they only promise a vague customer value, which leads to an unclear and poor positioning of regions in the health tourism market. Therefore, medical evidence, i.e. the use of scientifically proven and effective resources and interventions, is an essential prerequisite for health tourism. Regarding the growing scientific evidence of nature's positive effects on human health and well-being, natural resources build an excellent base for the development of evidence-based health tourism. Especially location-bound natural health resources and landscapes that are geographically specific and cannot be exported are likely to develop a unique health tourism appeal. However, to exploit the growth potential of nature-based health tourism a systematic innovation process as well as a structured product and destination development approach is required.

The Alpine Health Region Salzburg

The Austrian Federal State of Salzburg is currently following this approach through a government-driven health tourism regional development initiative. A project was launched to evaluate the health tourism potentials of natural resources in the Federal State of Salzburg.

Within this project, around 200 healing resources relevant to the development of health tourism were identified, located on a resource map and assessed by their medical and tourism potential.

This analysis built the base for the development of the "Alpine Health Region Salzburg" (Alpine Gesundheitsregion SalzburgerLand). Within this strategy, the province positions itself as major health tourism destination in Europe. In cooperation with all relevant stakeholders, evidence- and indication-based health tourism products are developed and promoted. A strong focus is on location-bound natural healing resources as basis for health tourism development and USP for specific destinations. This is seen as a clear competitive advantage, as the product core is rooted in specific regions and cannot be moved elsewhere or replicated in different contexts.

The strategy of the Alpine Health Region Salzburg is characterized by a constant dialogue between the federal government, medical research and science, the tourism industry as well as regional development agencies. This high level of interdisciplinary interaction fosters quality, professionalism and specialization and guarantees the development of tourism services based on scientific evidence at all stages of the process. Furthermore, it stimulates intersectoral and interorganisational cooperation to boost regional tourism development and the creation of innovative health tourism value chains.

Regarding the further development of the Alpine Health Region Salzburg, great importance is attached to medical-scientific substantiation of identified healing resources and to qualification and knowledge-transfer initiatives in order to strengthen the innovation capacity and knowledge-base in health tourism.

Keywords | Health tourism, evidence-based medicine, regional development, public health, natural health resources



Landscape and a Memory for Mental and Spiritual Well-being

Janez Pirnat

University of Ljubljana, Slovenia

Landscape structure can be viewed through VISIBLE sights (natural givens, cultural, social and technical development) or through INVISIBLE givens such as: political power, marginalisation, historical experiences, and collective memory with its atmospheric feelings.

The latter are important in landscapes and abruptly changed after the World War II, where people suffered violence beyond imagination. Such an example is former Kočevsko, a territory of 787km² in the south of Slovenia.

Former Kočevsko was settled in the first half of the 14th century by inhabitants from Eastern Tyrol and Western Carinthia. The decline of the region started in fact in the late 19th century (an economic emigration), but most significant changes resulted from World War II. World War II brought upon Slovenia not only destruction, but also civil war and a change of the political system from democracy to communistic totalitarianism. Immediately after World War II communists killed several thousand inhabitants of Slovenia, buried them secretly, often in carstic caves, usually hidden in forests. Kočevsko became therefore one of mass murder sites in Slovenia. Destruction that was caused by war devastation and by the change of political system immediately after the war, as well as by systematic destruction of the cultural heritage by Gottscheer Germans, in favour of ideological and nationalistic reasons, is striking. Of 177 settlements, 112 were destroyed or burnt and they exist no longer, or few houses are left. In the area of 17 parishes with 123 churches and chapels today only 28 churches remained. A similar fate as with the churches was a fate of schools and even cemeteries. Of the former 38 cemeteries, most

were cleared or destroyed, and tombstones that testified the settlement of the German population were removed.

What once used to be a cultural landscape with a rather easy access turned into a dramatically different forest landscape with nearly 89% forest cover as a result of natural afforestation.

From the end of the war until the change of the political system in 1991, it was forbidden to visit openly such grave areas and to roam there freely - any access was denied. After the democracy has been re-established, all these crimes became known, however the lack of archived documents did not allow any war crime trials to be legally carried out.

Because of this, Kočevsko with its massive graves and its truth, that has not been faced, remains a place of invisible discontent and deep sadness in collective memory. In order to gain back spiritual well-being, a basic reconciliation and aims for truth are needed.

The truth about the past and reconciliation requires:

- Critical confrontation with the crimes of communism (Titoism)
- The (new) law of war graves
- Topography of registered graves with a new evaluation of „memorial forests“ around these sites (when they are found in a forested landscape)
- A uniformly accepted memorial / museum of totalitarianism

Keywords | Collective memory, mass murder, reconciliation, spiritual well-being, World War II



Health and Natural Environment: A Case Study of the Inhabitants and Visitors of the Natural Park of Montseny (Catalonia)

Teresa Romanillos ^[1], Albert Bach Pagès ^[1], Lina Masana ^[2], Roser Maneja ^[1], Martí Boada ^[1]

^[1] Institute of Environmental Science and Technology (ICTA), Spain

^[2] Leeds Institute of Health Sciences. University of Leeds, United Kingdom

It is well known that people's health and their health-related behaviours are linked to the territory where they live. Related to this, in recent years, there has been a growing interest in studying these relationships between the environment and health.

The current research has two main goals: first, study the perceptions that people living in a certain region have towards their own health and the role that they give to natural environment for their health and wellbeing; second, establishing the common health conditions of people living in that area, following an environmental epidemiological approach, as an attempt to create a medical topography of the area.

The study has been conducted in Catalonia (Spain), in the Montseny Natural Park area, which is a region located 50 km from Barcelona that includes a variety of communities ranging from Mediterranean and Central European forests. The Montseny Natural Park was declared a biosphere reserve by Unesco in 1978. These features make it an appealing place to visit for both inhabitants and visitors from close cities, such as Barcelona.

In order to assess the health status of the people living in the zone, an analysis of the prevalence and incidence rates of 48 pathologies and health problems in a specific period (2014) has been carried out. Data comes from the Catalan Health Service database and the list includes the most common pathologies with the greatest impact: heart diseases, cancer, diabetes, respiratory diseases, psychiatric disorders, kidney disorders, infectious diseases (such as pneumonia, meningitis and influenza) and reproductive disorders. It also analyses the hospitalization and mortality rates. This data has been analysed (statistical study) and compared with the incidence and prevalence of the same pathologies for the rest of Catalonia.

In order to learn about people's perceptions related to health and natural areas, 500 surveys were carried out in two different population groups. First, 250 surveys with a group of external patients of medical specialities at the Hospital of Sant Celoni, located near the Natural

Park of Montseny. Second, 250 surveys to visitors to the Natural Park of Montseny. We intend to compare both groups of participants (inhabitants-patients and inhabitants-visitors) in order to learn similarities and differences relating to their perceptions towards natural environment and the use of nature for health and wellbeing purposes.

Data collection was done through self-administered questionnaires. Questions sought information related to activities developed in the natural environment, highlighting those that could be related to health (exercise, medicinal plants collection, etc.). It also collected information on the perception of their health problems (if they had) as well as the perception of nature as a source of health.

The preliminary results from the hospital's survey show that 91 % of respondents considered that natural environment is beneficial for their health and 56 % 'seek for health' when visiting natural areas. In this regard, the most valued elements were 'fresh air' (26 %) and 'quietness' (13 %). The most valued reasons given for visiting natural areas were: 'enjoyment', 'quietness' and 'health'. Collecting plants and mushrooms proved to be a common activity; 54 % of respondents consume medicinal plants (and within this group 40 % collect the plants themselves). The most common species collected are thyme, rosemary and mint. Concerning exercise practice, 50 % of respondents do it in the natural area. Among these, 65 % do it because they consider that it is beneficial for their health and 30 % for landscape viewing.

The rest of the study is still on analysis. More definite results will be presented at the conference.

Keywords | Natural areas, human health, perceptions, health behaviour



Treetop Walks – Access to Green Spaces and a Modern Approach to Social Inclusion

Oliver Thassler

Naturerbe Zentrum Rügen, Germany

Spectacular Landscapes are often non-accessible or offer only limited access to persons with physical disabilities. Treetop walks provide an innovative approach to increase accessibility to impassable landscapes and green spaces, they are ground-breaking tools to explore and discover landscapes and greenways. Our wheelchair friendly treetop walks with its spectacular architecture fulfil the task of environmental education and edutainment particularly in National Parks and Biosphere Reserves. All treetop Walks of the Erlebnis Akademie AG are in corridors and greenways of high value for biological diversity. The powerful and impressive design of our Treetop walks embedded in breath-taking landscapes reaches more than 200.000 visitors per year per Treetop walk.

Our treetop walks meet the demands of a modern approach of social inclusion; they also contribute to the protection of nature, provide a canny tool for environmental education and generate economic benefits. Theses Treetop walks are win-win models for tourism and nature conservation in the sense of a sustainable development. Treetop walks are hot spots of accessible environmental edutainment. They unite smart and playful environmental education with information about the surrounding nature and a whole lot of breath-taking view - educational yet divertive edutainment for people of all ages. Treetop walks even support and facilitate the management of the conservation area and raise awareness for the accompanying challenges.

On our Treetop walks we invite explorers of every age, tourists, classes, and scientists to get new perspectives on nature. Surveys amongst visitors of the Treetop walk of the Naturerbe Zentrum Rügen show that 2 % of interviewed persons consider themselves mobility disabled. This consequently means that over 6000 visitors benefit each year from the accessibility provided by our facility (Naturerbe Zentrum Rügen, visitor survey data 2016). The five educational aims of Treetop walks are: Inspiring visitors with the beauty of different landscapes in National Parks and Biosphere Reserves, informing visitors about our natural heritages, encouraging recreation in a unique and diverse environment, offering visitors an outstanding experience and raising the awareness for the importance of nature and protected areas.

The powerful and spectacular design of our Treetop walks is so successful, that the Erlebnis Akademie AG has cooperated with different National Parks, Biosphere Reserves and Regional Parks in Germany and the Czech Republic. Currently further treetop walks are being planned/are in progress to continue fascinating visitors with the world of trees. One aim is to transfer the idea of Treetop walks into other landscapes and greenways in the future.

Keywords | Treetop Walks, Social inclusion, barrier-free edutainment, green spaces access, Green Care offers, human health and well-being



Analysis on Accessibility of Urban Forest: Towards Enhancement of Well-being in Urban Regions

Yuta Uchiyama, Ryo Kohsaka

Tohoku University, Japan

Urban forests contribute to the enhancement of well-being in terms of multiple ecosystem services (ES). The accessibility of urban forests is a fundamental factor in acknowledgement of ES from urban forests. In aging society, it needs to be considered in the managements of urban forests that different age groups of urban residents have different relationships with urban forests. For example, the amount of time spent in urban forests can differ among the age groups. Accessibility and attributes of urban residents who acknowledge ES from urban forests have been changing. Understanding the demand side of ES and the accessibility provide basic information for the sustainable urban forest managements. In this research, those spatio-temporal trends of the relationships between urban residents and forests are analysed. A Japanese city that is moving to depopulation trend is the research site. The results provide a scientific platform to develop the strategies in the era of shrinking.

According to the precedent study, the city analysed in this research is categorized in the Japanese city group that is characterized by forest lands. The precedent study focuses on the rate of individual landcover categories and diversity of their categories. Spatial pattern of individual landcover categories and accessibility are not considered in the study. Even if two cities have the same rate of each landcover category, spatial pattern of each

category may be different. Different spatial patterns of landcover categories produce different quality and quantity of ecosystem services. In this context, the amenity of urban area based on ecosystem services depends on the spatial patterns of landcover categories. The method of this research can be utilized in the categorization of cities based on the spatial patterns and accessibility of individual landcover categories. By that categorization, cities can find cities with similar characteristics of those spatial patterns and accessibility.

In the future research, the result of this analysis can be disseminated through web sites, and can support activities of urban residents. For example, there are urban forests near districts with high aging rate. Those forests may have difficulty in daily maintenance. By recognizing those forest lands in a wider urban area, residents in different districts have the opportunity to support the maintenance of those forests. At the first stage of maintenance of urban forests by a bottom up manner, understanding the situation of urban forests and their daily maintenance is required to motivate and facilitate urban residents with different attributes including age and gender.

Keywords | Urban forest, landcover, accessibility, well-being, aging



Identifying Landscapes and Ecosystem Services Producing Wellbeing and Health Benefits in Nature-based Tourism Resorts

Marja Uusitalo, Rainer Peltola, Vesa Nikula

Natural Resources Institute, Finland

It has been estimated that by 2050 two-thirds of the world's population will be living in urban areas. This scenario signifies a dwindling daily contact with nature and consequently an increasing demand for outdoor recreational services and nature-based tourism. For instance, in Finland a third of all foreign tourists and 40 % of domestic visitors participate in nature activities.

Commercially available nature activities (i.e. programme services) in Finnish nature-based tourist resorts – the most common being snowmobile safaris, guided hikes and wildlife watching – principally rely on cultural ecosystem services with immaterial value. However, provisioning services are rather underutilised tourism resources in Finland. There are plenty of products available that are considered superfoods, on which the holistic wellbeing of tourists can be built. Furthermore, programme services have usually focused on the winter season.

This study, which was implemented in the Levi nature-based tourism resort in Finnish Lapland in 2015, aimed at identifying the sites and ecosystem services that offer health and wellbeing benefits in the proximity of the tourist resort during snow-free seasons. In the first phase, data was collected about natural landscapes that have high visual or ecological diversity and provide opportunities to encounter local wildlife. Meadows, former agricultural land and forests, where wild food (berries, mushrooms and herbs) is likely to grow, were located. Additionally, the PPGIS (public participatory geographic information system) was used to identify the

tourists' favourite places. In the second phase, a visual overlay analysis was carried out with ArcGis in order to identify the hotspots in which ecological and perceptual values were combined.

The landscape assessment, which was based on the collected data, produced twenty hotspots. These sites will form a foundation for a network of natural areas designated for the development of wellbeing tourism in the Levi resort. These hotspots included five areas that have the potential for high bilberry yield. The berry maps showing these areas were prepared and provided for programme services in 2016. Furthermore, the probability of high berry yield was increased by providing nesting and nectar foraging resources (i.e. artificial nests and nectar-bearing plant meadows) for the intrinsic insect pollinator population.

This study introduced a multi-faceted approach for governing nature resources and demonstrated methods to enhance ecosystem services for wellbeing tourism in nature-based tourism resorts. The findings of the study have practical implications that were adopted by local enterprises. There are already six ideas currently being brainstormed about guided nature tours that have a green care approach and take place in the hotspots. All six tours would involve serving wild food on site.

Keywords | Wellbeing tourism, ecosystem services, landscape assessment, wild plants, nature-based tourism resort



Effect of Forest Bathing on Urinary Oxidative and Anti-oxidative Biomarker Levels

Dahong Wang^[1], Tokushi Horike^[2], Masamitsu Miyanaga^[1]

^[1] Okayama University of Science, Japan

^[2] PHL, Japan

Introduction

Reactive oxygen species (ROS) are produced as by-products of oxygen metabolic processes in all aerobic organisms. When the generation of ROS exceeds the ability of antioxidant defence systems to remove them, such an imbalance can cause oxidative damage to cellular constituents (DNA, proteins, lipids, etc.), which is defined as oxidative stress. Many studies have shown that oxidative stress is responsible for the initiation and progression of various diseases.

It has been reported that people who live in areas with more green space having fewer cardio-metabolic conditions and lower mortality risks, and that forest bathing is also found having positive effects on human physiological functions although the mechanisms regarding health benefits of forest environment are still unclear. This pilot study aimed at examining how the levels of urinary oxidative and anti-oxidative biomarkers altered before and after forest bathing in healthy young subjects.

Participants and Methods

Nine students voluntarily participated in the study. Forest bathing was carried out in the forest of Okayama Prefecture of Japan for two hours. Saliva and spot urine samples were collected before, next day, and one week later of forest bathing and stored at -80 °C before analysis. The urinary 8-Hydroxydeoxyguanosine (8-OHdG) and malondialdehyde (MDA), which are considered as biomarkers of oxidative damage of cellular DNA and lipids, respectively, were measured, and an antioxidative biomarker, urinary total antioxidant power (PAO), was also measured.

Each subject was also asked to complete a questionnaire regarding their lifestyle and profile of mood state (POMS) before and after forest bathing. The study was approved by the Ethics Committee of Okayama University of Science, a written informed consent was obtained from all participants. All statistical analyses were carried out using SPSS.

Results

Compared with the pre-forest bathing, the urinary of 8-OHdG levels of the participants were markedly decreased on the next day of the forest bathing, and there was a significant sustained effect even after a week ($p < 0.05$). An increased tendency of antioxidative biomarker PAO in urine was observed in the next day of the forest bathing, particularly after a week ($p < 0.05$). The Urinary MDA levels also showed a decreased tendency after forest bathing compared with pre-forest bathing. Regarding the subjects' mood changes assessed by POMS, the score of Anger-Hostility showed a significant decrease after forest bathing ($p < 0.05$).

Conclusion

The present study suggests the possibility that forest bathing might decrease the levels of urinary oxidative biomarkers through strengthening the antioxidative defence systems. Future study with an increased sample size will be necessary to verify the present results.

Keywords | Forest bathing, 8-OHdG, PAO, Biomarker, urine



Urban Agriculture and Health – A Swiss Case Study: The Contribution of Urban Agriculture to the Town's Society and Environment

Hans Wydler

ZHAW School of Life Sciences and Facility Management, Switzerland

Material and Methods

Mainly qualitative short interviews, targeting consumers and users. The results of the survey were summarized in a discussion with the focus group

Results

The investigated examples offer manifold social services for their surroundings. The services include:

- Green places for recreation, with the possibility to animal encounters (e.g. open stable doors)
- Educational offers for teenagers with special needs
- Contact with flora and fauna
- Participation in harvest activities, celebrations of seasons, other events
- Direct marketing
- Community vegetable planting

The services were heavily influenced by the urban environment, by participating townspeople with individual needs for health requirements. The results of the questionnaires showed the diversity of utilization and the high value of the services offered. Objectives of the user groups are recreation and relaxation, physical exercises, nutrition, celebration of festivities, or enjoying

the rural surroundings. The agricultural enterprises use their good social networks for offering such activities. Other characteristics of the businesses are their diversification and the impact of the manager's values on the services offered.

Conclusion

Agricultural enterprises in urban environments offer services contributing to health and well-being. The investigated cases are best practice examples. The health promoting services and offers for environmental education are economically important for the businesses. In the meanwhile the services are an important contribution for society. One finding is that there is still potential to improve the exploitation of agricultural enterprises for health care and well-being. The encountered cooperation and networks are exemplary for farmers, who want to extend their offers in the area of health, society and social services.

Keywords | Agriculture, landscape for recreation, urban areas, green care



Health, Social Aspects and the Future Potential of Austrian Forests

Ziehaus Leopold

Division III/4 – Forest Area Planning and Sustainable Forest Resource Development,
Federal Ministry of Agriculture, Forestry, Environment and Water Management, Austria

The woods and society

The forest, influencing the living environment of people, animals and plants, are a fundamental basis of Austria's ecological, economic and social development. Its sustainable cultivation, maintenance and conservation are fundamental to ensure their multifunctional effects in regard to utilization, protection, good health and recreational activities. Lately the topics "water management", "climate protection" and "biological diversity" have gained in significance. Now we also see an increasing awareness of its beneficial effects on health.

The center of forestry-political endeavors is the optimization of reconciliation of interests between wood lands proprietors and other social groups. Thereby the topic of "Forest and health" has been discussed by various interested and responsible partner-institutions. Furthermore, the opportunities and potentials, connected to the issue, as well as the need for action have been revised and refined.

The woods and health/social aspects

The variety of subjects ranges from the central role woods play for the development of the climate, preventing and improving of air pollution, retention of sustainable drinking water, safe keeping of life in the mountainous regions, the actual and potential contributions to prevention and health care as an (at least partially intensively utilized) "space" for regeneration, recreational activities, sport and tourism, as "refugees" for people suffering from stress, "a heaven of tranquility" for nature lovers, a sought-after educational establishment, an idyllic setting of scenic beauty, as well as an area for therapy and social interactions, etc. Forests and wood lands greatly contribute to "health".

Activities in Austria include the Austrian conference "WALD und GESUNDHEIT" (Forest and health) taking place from 27th to 29th of October 2011 in Lower Austria. The main goals were the attempt to make wood land proprietors aware of the ongoing events concerning the topic, to identify the current state of knowledge and the topic's range, the potentials and opportunities,

as well as the future duties, and to illustrate this with up-to-date examples from theory and praxis. As far as it concerns follow up events, the platform "Wald und Gesundheit Österreich" (Forest and health Austria) have been established, embodying the four areas of interest, and discussed at the conference: the effects on health, therapy and social activities, products and interdisciplinary topics (for example culture, law, history, public relations).

Furthermore one has to mention the literature study "Green Public Health - Benefits of Woodlands on Human Health and Well-being" by Renate CERVINKA, MedUni Wien, and Arne ARNBERGER, University of Natural Resources and Life Sciences Vienna, the brochure "Wellbeing and standard of live in the green sector", the handbooks "teaching nature", "Living diversity" and "Forest kindergartens in Austria" as well as the report by the BFW "Prevention of violence in the woods".

Green Care WALD

The project "Green Care WALD" is a platform, established by the BFW that enables interested wood lands proprietors to open their forest to people seeking recreation. It is intending to offer an open modular system, which can be adjusted to individual circumstances and new target audiences. The activities are in common with Green Care, a project of agriculture, which encompasses services, and projects, that have been offered in cooperation with institutions at agricultural and forestry revenues, in order to boost health issues, well-being and living standards.

In the future further activities are planned, such as the training course with diploma "Gesundheit im Wald" (health in the forest) with reputable, new, scientifically biased knowledge about the beneficial influences of the forest in accordance with law regulations (for example Medicines Act). Moreover, a dissertation is written about Green Care Forest.

Keywords | Beneficial effects, health care, Green Care, forestry-political endeavors



greencare

Wo Menschen aufblühen

International Conference on Landscape and Human Health: Forests, Parks and Green Care

May 17 - 19, 2017, Diplomatic Academy of Vienna, Austria

www.landscapeandhealth.at

List of Participants



Raf Aerts

WIV-ISP, Belgium

Gulshan Ahuja

Haryana Forest development Corporation, India

Brigitte Alex

University of Natural Resources and Life Sciences, Austria

Lucia Ambrusová

Forest Europe - Liaison Unit Bratislava, Slovakia

Oscar Andersson

University of Copenhagen Denmark

Arne Arnberger

University of Natural Resources and Life Sciences, Austria

Dieter Auinger

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Austria

Albert Bach

Pagès Institute of Environmental Science and Technology, Spain

Christine Bai

HSR Hochschule für Technik Rapperswil, Switzerland

Katharina Bancalari

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Austria

Martha Battaglin

Ramos University of Florida, USA

Nicole Bauer

Swiss Federal Institute for Forest, Snow and Landscape Research WSL, Switzerland

Ana Bernat

Aleksandras Stulginskis University, Lithuania

Claudia Patricia

Bernleitner kindsnatur, Austria

Sarah Böhm

University of Natural Resources and Life Sciences, Germany

Kathryn Bowen

Australian National University, Australia

Wolfgang Brauner

Ökoplan, Deutschland

Alexander Buck

IUFRO, Austria

Renate Cervinka

University College for Agrarian and Environmental Pedagogy, Austria

Tatiana Costa

Alana Institute - Children and Nature Programme, Brazil

Sjerp de Vries

Wageningen Environmental Research, Netherlands

Eric Dekker

Ministry of the Flemish Community, Belgium

Renate Eder

University of Natural Resources and Life Sciences, Austria



Sarah Eichinger

University College for Agrarian and Environmental Pedagogy, Austria

Dinand Ekkel

Aeres University of Applied Sciences, Netherlands

Marjolein Elings

Wageningen University, Plant Research, Netherlands

Lewis Elliott

European Centre for Environment and Human Health, United Kingdom

Kerstin Ensinger

Black Forest National Park, Germany

Sophie Ette

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Austria

Ronan Foley

Maynooth University, Ireland

Kerstin Friesenbichler

Umweltdachverband, Austria

Erwin Frohmann

University of Natural Resources and Life Sciences, Austria

Heli Gittins

Bangor University United, Kingdom

Shirley Gleeson

Nature Health and Wellbeing Ireland, Ireland

Gerald Golesch

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Austria

Carina Grafetstätter

Paracelsus Medical University Salzburg, Institute of Ecomedicine, Austria

Veronika Gsöls

SVB, Austria

Petra Hagen

Hodgson ZHAW Institute of Natural Resource Sciences, Switzerland

Sarah Hambidge

Bournemouth University, United Kingdom

Arnulf Hartl

Paracelsus Medical University Salzburg, Institute of Ecomedicine, Austria

Dorit Haubenhofer

Hochschule für Agrar- und Umweltpädagogik, Austria

Kerstin Hauswald

Germany

Susi Hawkinson

HealthPartners, USA

Sandra Hendrych

University of Natural Resources and Life Sciences, Austria

Joe Hinds

Canterbury Christ Church University, United Kingdom

Mathias Hofmann

Swiss Federal Research Institute WSL, Switzerland



Christina Holländer

Pukal Horticultural Therapie privat, Austria

Janka Horvath

ESSRG LTD, Hungary

Ronald Huber

Ministry of Agriculture, Forestry, Environment and Water Management, Austria

Hans-Peter Hutter

Medical University Vienna, Austria

Franziska Hütter

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Austria

Emilia Janeczko

Warsaw University of Life Sciences, Poland

Gerda Jimmy

Federal Office for the Environment Forest Division, Switzerland

Alexandra Jiricka-Pürner

University of Natural Resources and Life Sciences, Austria

Elisabeth Johann

Austrian Forest Association, Austria

Susanne Kaefer

Naturpark Sparbach, Austria

Andy Kaufman

University of Hawaii, USA

Ki Weon Kim

Kookmin University, Republic of Korea

Tong il Kim

Korea Forest Service, Republic of Korea

Thomas Kistemann

GeoHealth Centre, Germany

Sarah Knight

University of York, United Kingdom

Erich Koch

SVLFG, Germany

Klaus Kogler

Amt der Salzburger Landesregierung, Austria

Mirja Koschorke

Switzerland

Karoline Kreimer-Hartmann

Chance B Holding, Austria

Christian Lackner

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Austria

Magdalena Lackner

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Austria

Ulrike Lamb

Environment Agency, Austria

Jean Larson

University of Minnesota, USA



Monika Latkowska

Warsaw University of Life Sciences, Poland

Kyeonghun Lee

Korea Forest Welfare Institute, Republic of Korea

Jeonghee Lee

Korea National Institute of Forest Science, Republic of Korea

Lisa Lehner

Ministry of Agriculture, Forestry, Environment and Water Management, Austria

Andrea Lichtenecker

Naturfreunde Internationale, Austria

Nadja Lobner

Gabriels Garten, Austria

Peter Lohmer

Karl Schubert - Bauverein, Austria

Diona Los

Dutch Ministry of Economic affairs, Netherlands

Ludmila Marusáková

Forest Europe - Liaison Unit Bratislava, Slovakia

Sabine Matlasek

Self-employed, Austria

Peter Mayer

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Austria

Maria Meinert

Universität Bonn, Germany

Katharina Meyer

University of Göttingen, Germany

Tamara Muić

Faculty of Forestry, Yugoslavia

Daniel Münderlein

Universität Kassel, Germany

Kristin Nebel

University of Natural Resources and Life Sciences, Austria

Helena Nordh

University of Life Sciences, Norway

Wiesława Ł Nowacka

Warsaw University of Life Sciences, Poland

Janine Oettel

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Austria

Sabine Pahl

University of Plymouth, United Kingdom

Jin hee Park

Korea Forest Service, Republic of Korea

Sujin Park

Korea National Institute of Forest Science, Republic of Korea

Tytti Pasanen

University of Tampere, Finland



Christina Pichler

Paracelsus Medical University Salzburg, Austria

Janez Pirnat

University of Ljubljana, Slovenia

Barbara Plagg

Universität Bozen, Italy

Lidia Ponizy

Adam Mickiewicz University, Poland

Hemma Preisel

University of Natural Resources and Life Sciences, Austria

Ulrike Pröbstl-Haider

University of Natural Resources and Life Sciences, Austria

Nicole Prop

Green Care Austria, Austria

Georg Rappold

Ministry of Agriculture, Forestry, Environment and Water Management, Austria

Joachim Rathmann

Würzburg University, Germany

Markus Sallmannshofer

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Austria

Silvia Schäffer

Universität Bonn, Germany

Thomas Schauppenlehner

University of Natural Resources and Life Sciences, Austria

Michael Schulze

HSR Hochschule für Technik, Switzerland

Markus Schwab

University College for Agrarian and Environmental Pedagogy, Austria

Sylvia Stadler

Austrian Research and Training Centre for Forests, Natural Hazards and Landscape, Austria

Birgit Steininger

University College for Agrarian and Environmental Pedagogy, Austria

Karin Svadlenak-Gomez

University of Veterinary Medicine, Austria

Leide Takahashi

Fundação Grupo Boticário de proteção à Natureza, Brazil

Karin Tanja-Dijkstra

VU Amsterdam, Netherlands

Oliver Thassler

Naturerbe Zentrum Rügen, Germany

Camilo Torres

Universidad Jorge Tadeo Lozano - Colombia Wageningen University, Colombia

Wei-Lun Tsai

U.S. Environmental Protection Agency, USA

Stefan Türk

German Sport University, Germany



Liisa Tyrväinen

Natural Resources Institute Finland, Finland

Yuta Uchiyama

Tohoku University, Japan

Marja Uusitalo

Natural Resources Institute Finland, Finland

Agnes van den Berg

University of Groningen, Netherlands

Janke van Dijk-Wesselius

VU Amsterdam, Netherlands

Igor Vizslai

Forest Europe - Liaison Unit Bratislava, Slovakia

Aoibheann Walsh

Rural Support, United Kingdom

Chris Walzer

University of Veterinary Medicine, Austria

Dahong Wang

Okayama University of Science, Japan

Mathew White

ECEHH, Knowledge Spa, United Kingdom

Georg Wiesinger

BABF, Austria

Roswitha Wolf

Hochschule für Agrar- und Umweltpädagogik, Austria

Ellen Wulfers

Groenbeweegt, Netherlands

Matthias Wurster

Forstliche Versuchs- und Forschungsanstalt Baden-Württemberg, Germany

Hans Wydler

Institute of Natural Resource Sciences, Switzerland

Kayleigh Wyles

University of Surrey, United Kingdom

Carolina Yang

International Forestry Students' Association, Taiwan

Youngkyoon Yoon

Korea Forest Welfare Institute, Republic of Korea

Chris Young

Swiss Federal Institute for Forest, Snow and Landscape Research, Switzerland

Josef Zeiner

FH Campus Wien (Advanced Nursing Practice), Austria

Gaochao Zhang

University of Copenhagen, Denmark

Leopold Ziehaus

Ministry of Agriculture, Forestry, Environment and Water Management, Austria

