



Place-Based Citizen Science with Refugee Youth

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FOREWORD



Good health and well-being, decent work and economic growth, and reduced inequalities are three of the seventeen Sustainable Development Goals adopted by the United Nations in 2015. Despite certain progress, these goals are still out of reach for many population groups, especially refugees. At the same time, displacement scenarios become increasingly complex, and the scale of forced displacement of people will only grow in the future. This calls for new, creative strategies for supporting the displaced, and special attention should be paid to refugee children and youth, a particularly vulnerable community.

Research into the support strategies for refugees suggests the importance of places and activities that instill a sense of competence and autonomy, and provide opportunities for education, social interaction, restoration, and recreation. This brochure aims to draw attention to an activity that uniquely combines all of these components – namely, place-based, outdoor citizen science.

Indeed, place-based citizen science provides space for personal development and learning, for meeting like-minded people, for doing something useful for the local community. Importantly, it encourages deep interaction with the environment, enriching the image of the city with new meanings, emotions, and affective ties. It thus contributes to place attachment, which is known to be closely linked with the physical and emotional well-being of refugees.

While citizen science with vulnerable communities remains a resource-intensive endeavor, we share a vision that the efforts are largely outweighed by the multiple transformative effects of such projects. With this brochure, we hope to inspire you to think the same!



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// **CITIZEN SCIENCE WITH REFUGEE YOUTH**

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ABOUT THIS BROCHURE

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WHAT IS THE IDEA BEHIND THIS BROCHURE?

Citizen science – public participation in scientific projects – is becoming a very popular activity today. In The Netherlands, we have seen the establishment of the Citizen Science Nederland (CS-NL) network in 2022. An increasing number of projects give voice to communities and address problems put forward by citizens, making our cities more inclusive and sustainable.

However, citizen science today still does not reach the wider population, leaving aside places and groups of the population whose lives could benefit most from the activities. One example of such systematically excluded groups is refugees and temporarily displaced youths.

“Rangers Twente” is a unique citizen science community created for temporarily displaced children (aged 8-14) from Ukraine. Initiated at the University of Twente in the summer of 2022, it has been growing rapidly ever since, showing its high relevance for society. In the summer of 2024, this includes members from all major cities in Twente, a region in the Overijssel province in the Netherlands.



This brochure describes the pioneering experience of Rangers Twente, focussing on the multifaceted benefits for its participants. It also includes reflections and recommendations for organizations and municipalities, promoting citizen science as a unique therapeutic and empowering activity.

We hope to inspire you to think of citizen science as a unique therapeutic space that contributes to the resilience of our communities and ecosystems alike.



WHAT AWAITS YOU ON THE PAGES AHEAD

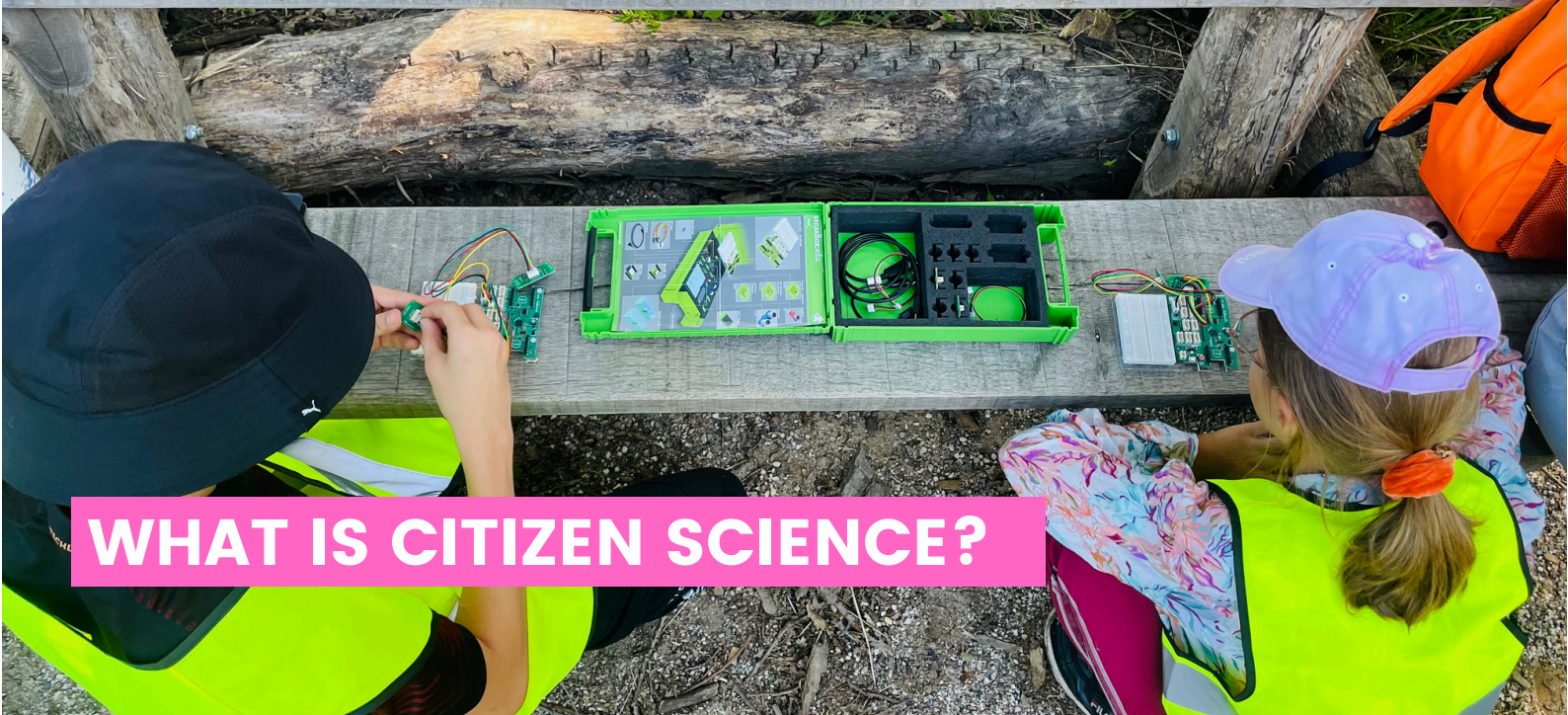
The “Rangers Twente” community was shaped to engage refugee children and youth from Ukraine in the active exploration of their new home environment as part of scientific projects during summer vacations. Apart from providing insights into the refugee youth’s perception and use of urban spaces, it aimed to provide them with a space for the restoration of basic needs.

In “Water Rangers” (the summer of 2022), 17 children from a refugee facility in the city of Almelo explored the biodiversity and attractiveness of 57 local lakes, rivers, and canals. In “Mapping for Recreation - Map4Rec” (the summer of 2023), 74 children from refugee facilities in 6 cities in Twente explored and mapped 101 places for sports and recreation.

Our key objective is to showcase the multifaceted nature of place-based citizen science. Apart from collecting valuable data on youth’s perception and use of urban spaces, such projects allow participants to gain new knowledge and skills, restore key basic needs such as autonomy and sociality, and explore and gain first-hand, embodied knowledge of the new surroundings.

The brochure defines citizen science and its benefits in general, followed by a detailed description of “Water Rangers” and “Map4Rec”. It then focuses on the results of interviews and focus groups, where participants shared their experiences in the projects, followed by the project team’s initial observations and recommendations.

WHAT IS CITIZEN SCIENCE?



WHAT IS CITIZEN SCIENCE?

Citizen science is a public engagement in the scientific process. Citizen science projects are very diverse: in some, members of the public only help to collect data, in others, they help to identify important research questions.

Geographic citizen science has a strong geospatial component. The increasing availability and democratization of geospatial technology allow to collect geo-referenced data at an unprecedented scale.

Place-based citizen science is a type of geographic citizen science where participants closely interact with certain locations — for example, monitor a beach, or a park.



Anyone with a smartphone can share a wealth of information on the environment, whether grounded in their perceptions and unique experiences with places (e.g., the perceived attractiveness of places) or measured with sensors (e.g., the level of noise or pollution).

BENEFITS OF CITIZEN SCIENCE

Geographic citizen science empowers communities to address diverse issues in their local environments, but also brings multifaceted benefits to its participants.



empowers communities to raise and solve diverse issues in their local environments



allows for multiple forms of sociality – meeting like-minded people, sharing what one sees and learns, and building new connections



provides opportunities for personal development and learning, increases participants' self-efficacy through new knowledge and skills



strengthens connections between people and nature, and provides physical and emotional benefits from exposure to nature



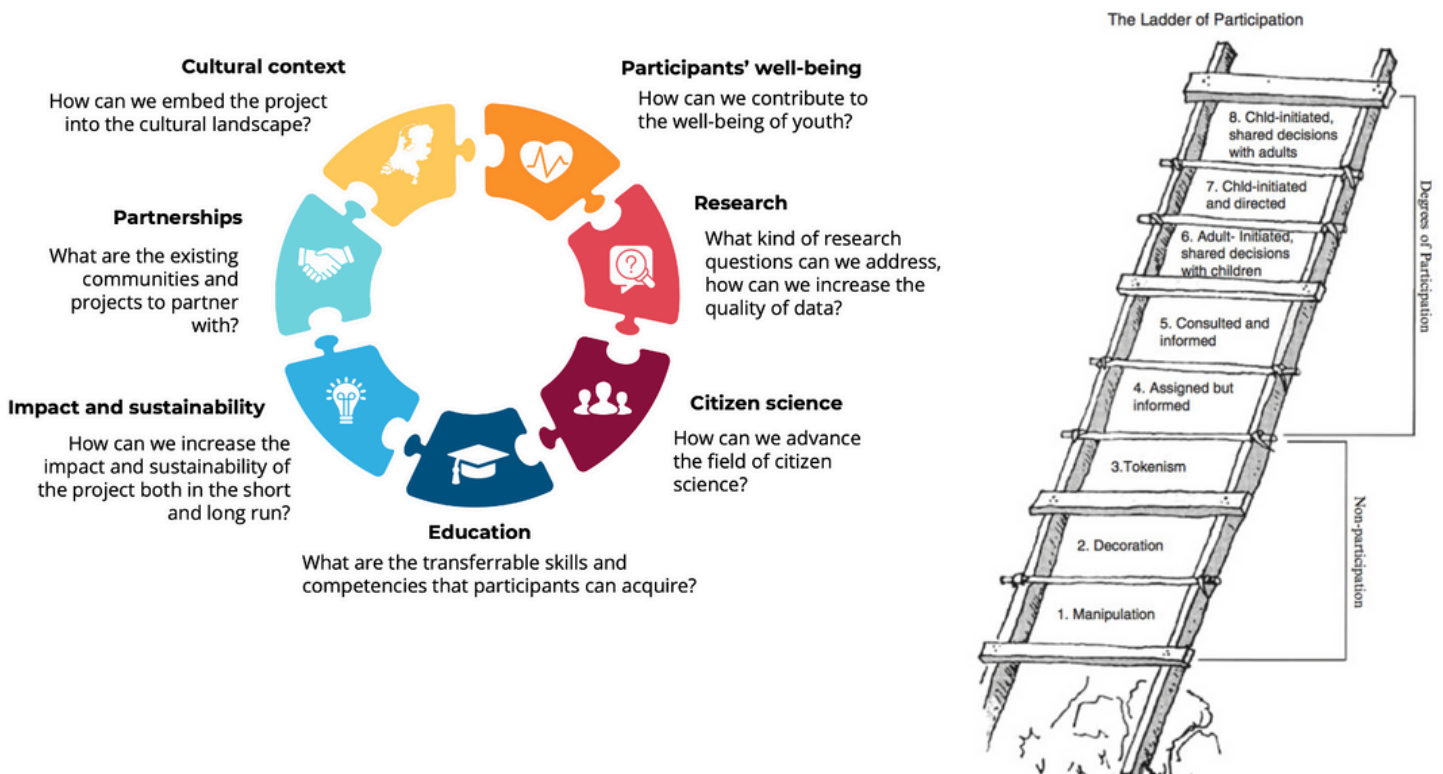
contributes to place attachment, enriching participants' images of cities with new emotions and meanings

...and so many more!

RANGERS TWENTE



The design wheel of “Rangers Twente” had several important “spikes”. Apart from addressing research questions related to inclusive urban planning (broadly, exploring how refugee youth perceive and engage with places), we aimed to address the basic needs of newly arrived children, introduce them to the local context, and provide space for new knowledge and skills. It was also important to us to design the projects in a way that would allow children to be actively engaged in decision-making, positioning “Rangers Twente” at steps 5 and 6 on Roger Hart’s ladder of participation [1].



Roger Hart’s original 1992 illustration from *Children’s Participation: From Tokenism to Citizenship*

RANGERS TWENTE OVERVIEW

WATER RANGERS, 2022

17

participants

21

days

80

fieldtrip hours

57

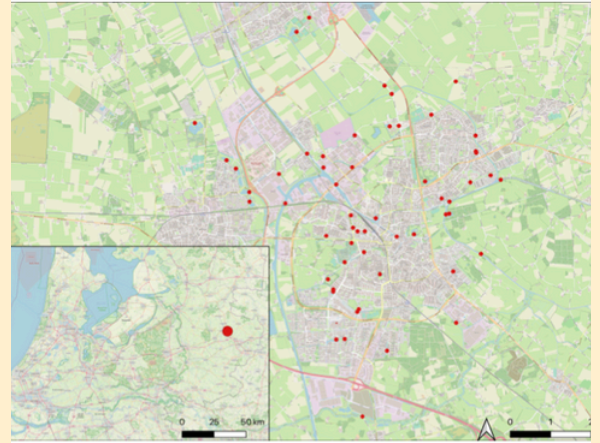
data points

Exploring urban blue spaces, taking measurements of water quality, filling in individual protocols on place attractiveness, designing a healthy urban blue space. In partnership with Natuur en Milieu.



Almelo

[Click here](#) to read the project report



The 57 urban blue locations visited during the Water Rangers project.

MAPPING FOR RECREATION (MAP4REC), 2023

74

participants

3

months

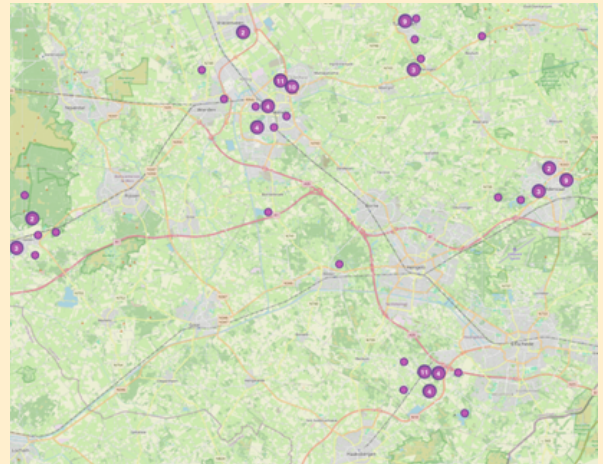
160

fieldtrip hours

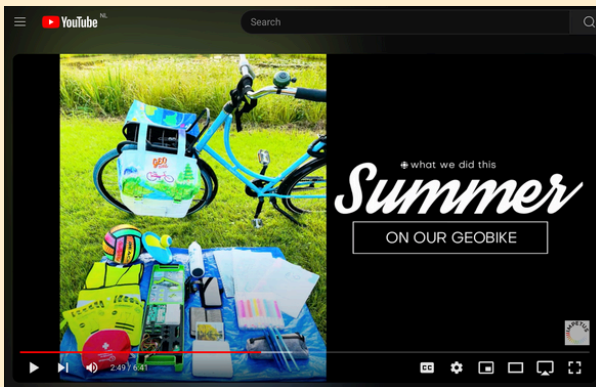
101

data points

Exploring and mapping public places for sports and recreation using the EpiCollect application to enter observations on possible activities, perceived place safety and attractiveness, together with sensor-based measurements (e.g., temperature); designing an inclusive recreation spot.



A snapshot from the Map4Rec project map on EpiCollect.



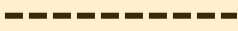
[Click here](#) to watch a short video about the project

[Click here](#) to explore the project map



**Almelo, Boekelo, Vriezenveen,
Oldenzaal,
Holten, Tubbergen**

WATER RANGERS, 2022



01

Introduction and training



02

Fieldwork



03

Data entry and analysis



04

Closing event



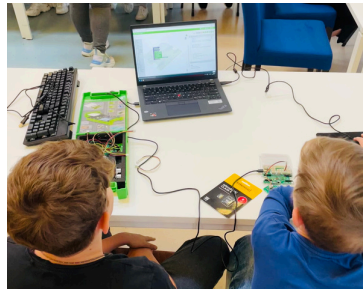
MAPPING FOR RECREATION, 2023



Introduction and training

01

Micro-module: Geospatial data collection



Co-creation

02

Co-creation of data collection protocols and project activities



Fieldwork

03

Data collection



Data analysis

04

Making maps, prototyping an inclusive place for recreation

Micro-module: Map making with QGIS
Micro-module: Design Thinking



Closing event

05

Presentation of maps, prototypes, and art projects at the closing event

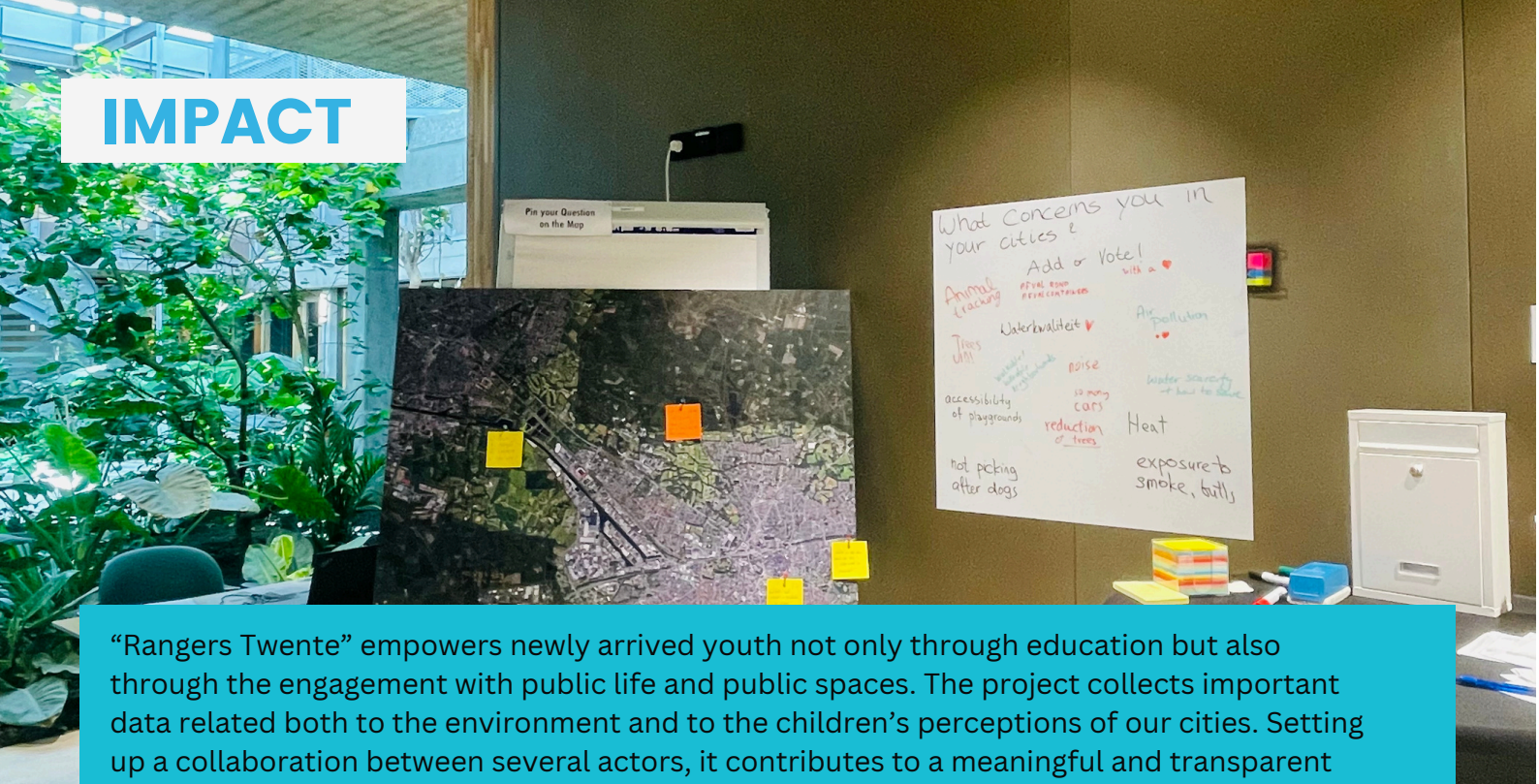


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IMPACT

IMPACT



“Rangers Twente” empowers newly arrived youth not only through education but also through the engagement with public life and public spaces. The project collects important data related both to the environment and to the children’s perceptions of our cities. Setting up a collaboration between several actors, it contributes to a meaningful and transparent engagement of diverse stakeholders within the community in the context of environmental sustainability. Jointly, these elements contribute to the resilience of urban ecosystems and human population alike.

SDGs addressed within the Rangers Twente projects:



Make cities and human settlements inclusive, safe, resilient and sustainable.

Understanding refugee youths’ patterns of recreation and perceptions of public spaces for recreation; youths as co-researchers



Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all.

Providing space for the development of transferrable skills: geospatial literacy, green and digital competencies



Ensure healthy lives and promote well-being for all at all ages.

Providing space for the restoration of basic needs

In what follows, we will focus on impacts highlighted by participants.



PLACE DISCOVERY

Place attachment – an affective bond between people and places – is closely linked with well-being [2]. For refugees, the first step in developing place attachment is place discovery, whereby individuals gain enjoyment and pleasure from an intentional familiarizing with the place. “Rangers Twente” participants report multiple types of platial and spatial knowledge gained during the projects, as well as positive emotions and memories tied to newly discovered places.

Knowledge of how to navigate. In both projects, children spent around 20 hours on fieldwork on bicycles, and also worked with maps and map-based applications. This allowed them to discover and remember landmarks and routes, improving their self-orienting and wayfinding ability in the new city.

Knowledge of how to engage. Lack of knowledge of places, possible activities, and codes of behavior can be a source of the feeling of unease and limited activities among refugees [3]. Newly arrived children typically have little possibility to explore places without the supervision of adults. In “Rangers Twente”, children discovered and mapped multiple places for recreation, gaining knowledge of activities by engaging with places, but also by observing local youth (e.g., fishing, or jumping into the water from the bridge).

Affective relationships with places. Both projects provided space for diverse positive emotions and memories at the newly discovered places. Through active play, teamwork, data collection activities, and interaction with residents and project volunteers, the images of the cities were enriched with new meanings for children, which is crucial for place bonding.

[Click here](#) for further reading

When we cycled around during this project, we got to see a lot of places, and I can now more or less self-orient in the city...and find my way home.

I have learned that there are a lot of beautiful spots in the city. One should spend more time in those places, in the nature. We have already found...and put a mental note on a few places, like that one with blueberries.

But of course, all places are different. Each place left some impressions and emotions. In each place there were funny moments, new jokes.



WELL-BEING

Newly arrived refugee youth are known to actively engage in place-making by purposefully seeking out therapeutic places that help address their basic needs – helping to restore self, autonomy and competence [4]. The project provided space for the restoration of these needs.

Restoration of self. Participants' reflections on their experience in "Rangers Twent" often contained words such as "joy", "emotions", and "recreation". Many comments related to fun recreational activities (e.g., "we had fun and made jokes", "there were lots of fun moments", "we played a lot", "being in the nature is cool, I've got a suntan"). The projects were compared to an adventure quest in nature, and one participant thought it was one of their best summers because of the "Rangers Twente".

Restoration of autonomy. The projects also restored participants' autonomy, allowing them to explore the cities without the supervision of their parent(s). In "Map4Rec", participants also enjoyed a strong decision-making capacity through the co-creation elements of the projects.

It was cool to go to all those places. I normally don't walk around much, because I am not allowed to walk on my own... [Before the project]. I had never been beyond [name of store].

At first, I thought it was some summer camp for younger kids...but once we started doing things, like when we had to seal up the sample probe quickly, it got very, very serious...I also felt that we were doing something useful...And the certificates that we have received might help us to get accepted to study ecology in the future, if we would like to.

Restoration of competence. The projects represented a meaningful activity that supported participants' sense of competence. They had a strong feeling that their work mattered and that they helped residents (by collecting litter), the scientific community of ecologists (by collecting data), and the population of The Netherlands (by contributing to the health of the water bodies and nature more generally). Contributing to the community is known to help refugees build their status, but also to leave a mark, a "footprint" in their new environment [3].

LEARNING

“Education is a lifeline for children in crisis” (UNICEF)

While current technologies increasingly allow for online education to address the needs of newly arrived refugee children, initiatives such as “Rangers Twente” can become an important complementary activity taking place in the local natural, social and cultural context.

Place-based citizen science provides space for multiple forms of learning: nature-based learning, challenge-based learning, multi-disciplinary curriculum, and co-creation of learning. Participants equally enjoyed learning activities in nature (e.g., learning about aquatic biota), challenge-based learning (designing a healthy and inclusive place for recreation), and more conventional workshops (e.g., programming sensors). “Rangers Twente” thus promote STEM and create a scaffolding for an international network of environmentally-oriented future citizens.

I had been imagining rivers as something “empty”...And then we found all these water animals during the project – I could never imagine there were so many living creatures in the water.

Knowledge, skills and competences developed in the project

Knowledge of Planetary Health and Sustainability

- Water Rangers: Micro-module “Planetary Health”, “Aquatic Systems”
- Map4Rec: Micro-module “15-minute city”



Geospatial literacy

- Route planning and navigation during field trips
- First-hand experience with geospatially-enabled data collection applications and data analysis
- Map4Rec: Micro-module “Sensor programming”, “Making Maps”

Green Competences

Micro-module “Design Thinking”, working on the project challenge (design of a healthy and inclusive place for recreation)

- promoting nature
- supporting fairness
- exploratory thinking
- systems thinking
- collective action
- individual initiative

SOCIAL BONDING



Various forms of sociality, from “doing alongside” (e.g., pushing a swing in a playground) to activities such as volunteering are known to offer refugees a restorative sense of transcultural connection, and help to engender a sense of belonging to the new community [3]. Equally important are social networks based on a shared identity – individuals affected by displacement have shared challenges, and can provide mutual support. “Rangers Twente” provide opportunities for bonding within the refugee community, but also with the residents.

Friend bonding. Participants got to know each other and strengthened existing relationships during the project. Although they had been residing at the same facility for around three months, some of the “Water Rangers” participants had not known each other before the project, and others had only had fleeting interactions. In “Map4Rec”, participants from different cities made friends during joint events (trip to the national park, and the closing event at the university), and maintained friendships after the project.

Community bonding. Participants also commented on multiple social interactions with long-term residents that occurred during field trips – being treated to ice cream by a woman living next to the pond where they were collecting data, being presented with gloves, litter pickers, and water bottles by a municipality employee, or being offered help with wayfinding during the geocaching activity.

“*Before the project I had been mostly spending my time at home because all my close relatives had stayed in Ukraine: grandma and grandpa, nieces, and the rest. And somehow I withdrew into myself. When the project started, I more or less opened up and started working in a team. Now I feel like I want to walk more, ride my bike, take part in projects, and not stay at home all the time.*”



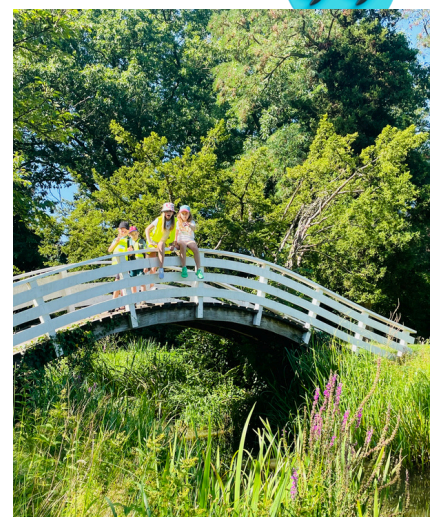
NATURE BONDING

Nature is known to have a restorative effect on physical health and emotional well-being. For refugees, visiting green urban areas can also recall landscapes of their home country, and such moments of familiarity and memory lead to place-making.

In both projects, participants spent a lot of time in the urban blue and green spaces and visibly enjoyed local flora and fauna. According to the focus groups, children appreciated the tranquility, the beauty of nature, the possibility to explore, climb the trees, pick berries, take nice photographs, but also just sit and relax. For many participants, spending time in nature brought memories of summertime activities in Ukraine, evoked a sense of release and freedom, and held a special meaning.

I felt I was free, far from everyone. I grew up in a village, and I have spent most of my life in the nature. I feel myself free in nature

I really like that place ... because it is very beautiful. One can just lie under the tree and enjoy the view... And you feel good, you don't want to leave, you don't feel bored, and you like it, you can spend time there... just lie down and relax



REFLECTIONS



REFLECTIONS

Place-based citizen science as a therapeutic and empowering activity

- Place- and nature-based citizen science **uniquely combines features of diverse refugee support strategies**. For refugee youth, it provides a safe space for outdoor exploration, education, and play. It allows for doing something useful for the local community and ecosystems, interacting with residents while delving into the local socio-ecological context. Place-based citizen science thus represents a genuinely **therapeutic activity for refugee youth**.
- Participants also acquire skills in working with geospatial tools and data, as well as transferable skills related to sustainability, leadership, and teamwork. Citizen science raises awareness about current societal challenges and creates **a scaffolding for an international network of environmentally oriented future citizens** who will become ambassadors for planetary health in their communities in the future.
- Importantly, citizen science **gives voice to the youths**, empowering them to participate in public life. It promotes their basic needs and rights, ranging from education and well-being to spatial justice and **participation in the shaping of city spaces**, as recommended by UNICEF's **Child-Friendly Cities** initiative.
- Based on our experience, place-based citizen science — due to its multifaceted nature — has the power to **unite multiple actors who share the same visions and values**, including environmental, educational, and volunteer organizations, municipalities, and museums. It leads to the establishment of a transparent and **trusting collaboration among diverse stakeholders**, united in their commitment to empowering disadvantaged youths.



It takes a village...

Citizen science is a relatively young discipline that grows with breathtaking speed. Given its novelty, conducting citizen science can be a resource-intensive endeavor. This is especially true for pioneering projects that engage vulnerable communities such as refugee youth, where additional language, technological, and societal barriers come into play. We firmly believe, however, that the **multiple transformative effects of such projects will largely outweigh the efforts involved in building the infrastructure for more inclusive citizen science.** To make such projects sustainable, long-term support for their upscaling is needed. Since place-based citizen science is deeply embedded in the local context, we call local and national authorities to:

- institutionalize place- and nature-based citizen science as a form of a refugee youth support strategy that encourages nature contact, strengthens social structures and integration, and improves longer-term mental and physical health
- institutionalize citizen science as a way of involving refugee youth in public life, develop procedures for making data collected in such projects actionable
- create innovative financing schemes such as co-funding to encourage the uptake of citizen science with vulnerable youth
- develop the digital infrastructure — such as online platforms with information on stakeholders and initiatives — to facilitate collaboration and collective action, thus amplifying the impact of such projects through the sustainable use of resources and societal cohesion

Citizen science with refugee youth should be seen as a support strategy that promotes nature contact and protection, leads to place discovery, strengthens social structures, and improves longer-term mental and physical health



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Tubantia
REGIO NIEUWS SPORT PLAY PODCAST FEELGOOD PUZ
Wijzig Enschede ► Net Binnen 112 nieuws Van de lezer Ult-tips Eten en drinken Re

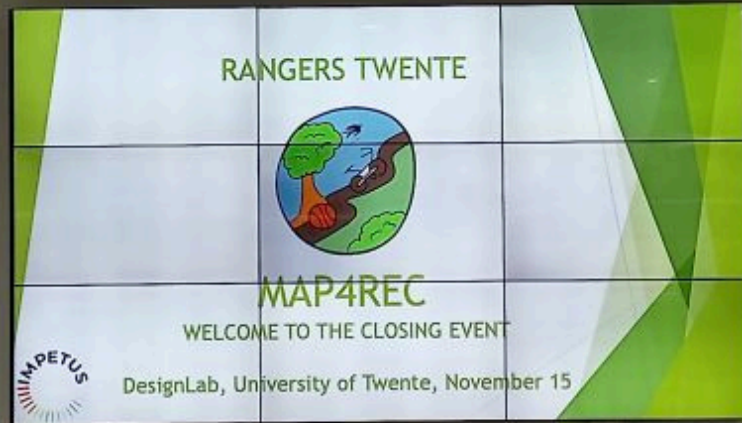
Oekraïense kinderen hele zomer druk met specialistisch veldonderzoek voor UT

▲ Damir (10 jaar), Sacha (8), Keenja (11), Katja (10) en Mira (10) bij hun maquette 'Starry Night'. Bezoekers mogen de dertien verstopte dieren ontdekken. © Wouter Borre

Article in Tubantia (in Dutch), accessible after free registration.

RESPONSIBLE FUTURING

**DESIGN
LAB**
UNIVERSITY
OF TWENTE.



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**We thank you for your continued support in our efforts to
make our cities and communities more inclusive and
resilient**

Geo and place-based citizen science provides multifaceted benefits to communities and ecosystems alike. Yet today, it does not engage evenly across all sectors of society, leaving aside places and communities whose lives could benefit most from its activities. Together we ensure that place-based citizen science is inclusive and contributes to resilient cities. Join us on this journey, hop on our GeoBike!

GEO CITIZEN SCIENCE

for resilient
communities
and ecosystems



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