

# How to – comprehensively – collect and depict data on conditions for sustainable transport in rural areas?

The approach of the Austrian R&D project “AlltagsSPUREN”\*

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**Abstract:** The Austrian cooperative research project “AlltagsSPUREN“ (loosely translated “everydayTRACES“) aims on developing tools supporting smaller (rural) municipalities in promoting sustainable and active mobility using quantitative and qualitative data gathering methods together with analysis and activation tools. These online and offline based tools will enable to examine the status quo, the demanding situation and the municipal potential regarding sustainable and active mobility. The tools will be tested in selected municipalities. The project focuses especially on encouraging a more active using of sustainable transport modes in everyday life – also taking factors of social inclusion into account. Barriers as well as supporting conditions for walking and cycling and other forms of active mobility are addressed within this project. A special focus is set on the local experience and inclusion of socio-economic groups that are usually marginalized in recent mobility projects. The project addresses local decision-makers and aims to contribute to the pre- and early phase of mobility planning, in order to strengthen knowledge and competence to remove barriers for promoting more sustainable and active mobility. In particular, the project focuses on data provided at local and regional level that can depict mobility conditions comprehensively with minimum effort. Furthermore, it is of interest how this data can be used for reliable scenarios of future mobility demands and determine which strategies can influence this development. The project team covers a broad range of knowledge and skills in the areas of diversity-orientated transport and landscape planning as well as mobility management and environmental informatics. This paper gives an insight in the first preliminary results.

**Keywords:** *sustainable and inclusive mobility, active transport modes, rural areas, webbased ICT tool, traffic and mobility model, municipalities*

## I. INTRODUCTION (*HEADING 1*)

### A. *Status quo: Specific needs of different socioeconomic groups and awareness for sustainable modes of transport*

Active modes of transport, such as walking and cycling, exhibit a wide range of ecological, economic and social benefits for individuals as well as for societies. Therefore, they are more sustainable modes of transport than motorized individual traffic (e.g. private car). Also the provision of public transport is an aspect leading to more sustainable mobility conditions, empowerment and social inclusion, especially for people with physical limitations, young people and elderly people. [10, 11]

Particularly, people with care-giving responsibilities, children and elderly people have a need for diverse mobility alternatives which consider their specific set of resources (time, money, abilities etc.). The choice of transport modes differs between people with care responsibilities and not-caregiving people. Currently, especially in rural areas, care-givers and people in care feel often more dependent on car transport, often by others, on their everyday trips, as they are not aware of alternatives or alternatives are in fact missing. [1] Traditional

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transportation planning approaches strengthen this feeling of car-dependency by setting a strong focus on motorized individual traffic.

However, the promotion of active and sustainable modes of transport may enable these socio-economic groups to handle their mobility needs more independently and save their resources (e.g. children can go to school by themselves and do not need to be accompanied by their parents). Accompanying trips therefore may be minimized if awareness for sustainable modes of transport is raised. [11] Research on exclusion is still rare and hardly included in mobility projects. If it is included, it is often limited to physical disabilities. [2] Other excluding aspects related to socio-economic circumstances and access to resources, for example care-giving responsibilities, are neglected.

The level of awareness for different modes of transport and types of trips varies in transport planning. Common travel surveys in Austria, for example, do not adequately examine short trips or complex trip patterns. Short trips on foot remain underrepresented due to their low rate of reporting. As a result, these surveys often confirm local decision makers in their point of view that "walking" is not fully worth considering and is not valued as an equitable mode of transportation. Consequently, transport-planning decisions are mainly based on data that tend to take into account walking inadequately [5, 9].

#### B. *Status quo: Rural areas and their special challenges*

Statistical data show that in the year 2014 2,278 municipalities in Austria have less than 10,000 inhabitants. Altogether they account for 4.6 million inhabitants or over 50% of the total population in Austria (total population: 8.5 million). [8]

These mainly peripheral and rural municipalities face special challenges and problems in the contexts of transportation, mobility and provision of public services and basic supply. Additionally, in the last decades public transport systems have been reduced in a considerable way. There is also a strong tendency of centralization of jobs and supply infrastructure. As transport infrastructure for cycling and walking is hardly developed in a sufficient way, many inhabitants of the communities face a feeling of car-dependency. [12] This aspect is strengthened by the fact, that the terrain in some part of Austria is partly very steep and difficult to access.

Demographic change is another aspect, which has to be considered in decision-making and transport planning processes. By the year 2030, 24% of the total population in Austria will be older than 65 years. That is an increase of 6 percentage points compared to the year 2012. In rural areas the proportion of elderly people will be even higher. [7] As demographic change affects especially peripheral and structurally weak regions, opportunities have to be found to guarantee independent mobility for the elderly and their participation to social, cultural, political and economic life.

#### C. *Status quo: Lack of comprehensive approaches*

Active forms of mobility ("mobility out of personal embodied resources" i.e. walking and cycling) were the dominant modes in the last centuries. In the last decades, though, they have become less important, due to societal and structural changes. These changes are constitutive for life circumstances, which trigger mobility behaviors. However, the lack of active mobility in our daily life has not only a negative impact on health and environment but also on our identification with our social environment and thus the social cohesion of a municipality. [4] In order to reach the goal of a more sustainable mobility of the inhabitants of communities, new ways and comprehensive methods have to be developed.

Although there are already some initiatives and networks in Austria, which provide support for the municipalities in their transport planning activities, few comprehensive approaches can be identified. There are initiatives, which support the municipalities in isolated situations (e.g. improving way to school for children, promoting investments in bicycle infrastructure, etc.). Moreover, tools are available to conduct analysis and planning activities. Currently, tools for sustainable mobility are mostly focused on:

- Mobility planning
- Simulation of traffic flows
- Estimation of effects of measures
- Calculation of traffic emissions and follow-up costs
- Accounting systems for mobility

Within the scope of the EU-project PROSPECTS, an easy to understand handbook for sustainable transport was developed for decision makers, which is also available in German language. Moreover, a web-based database (KonSULT) was created, giving examples for possible activities for sustainable land use and transport. However, this database is available only in English language and is addressing urban transport planning. Moreover, a comprehensive analysis of the status quo in the municipalities not included. [3]

However, these tools are quite complex and mainly address consultants, planners and scientists, but not decision makers in communities and municipalities. (Nota bene: In Austria municipalities are in charge of most of transport planning responsibilities.) In most cases comprehensive analysis approaches including socioeconomic parameters are not included.

## II. THE AUSTRIAN R&D-PROJECT "EVERYDAYTRACES"\*

#### A. *Aim*

The overall aim of the project "AlltagsSPUREN" is to develop a set of web-based ICT analysis and activation tools that comprehensively assists rural municipalities by fostering active and sustainable mobility, which primarily means to foster environmental friendly, socially acceptable and resource-sensitive forms of mobility. These tools shall promote active

and sustainable transport modes in everyday life in cooperation with municipalities of up to 10,000 inhabitants. Thereby socio-economic groups, which are usually neglected in traditional traffic and mobility planning methods and mobility projects, such as patchwork-households, people with caring duties or unemployed young people, will be particularly addressed in order to raise awareness for their mobility needs and avoid further exclusion during planning processes.

### B. Planned project outputs

The tools under development consist of three parts, which are, as follows:

(1) A freely accessible, interactive web-based platform aiming on raising awareness for sustainable mobility among the municipalities' population and encourage joint measures to foster sustainable mobility in the municipality. It allows citizens to report their experience with active transport modes in their municipality. This tool does not aim on purely mark neuralgic points, but encourages the users to tell their private mobility stories. This helps politicians and planners to create a mobility futures connected to the experiences from the past.

(2) A digital analysis tool for municipalities' politicians and local authorities, to comprehensively conceive the status-quo of mobility characteristics and framework conditions of active and sustainable modes of transport within the municipal area, taking into account various socio-economic aspects of population. A check of the relevant framework conditions in favor or limiting sustainable mobility is made based on data from public statistic and information provided by the municipality. The tool allows to identify the needs for improvement as well as potentials at a glance and thus helps policy makers and planers to develop problem-centered mobility solutions. For this purpose, algorithms were developed based on scientific findings. The tool depicts mobility conditions comprehensively with minimum effort.

(3) A digital scenario tool for developing scenarios and derive directions of actions regarding the achievement of targets towards more sustainable mobility within the municipality. The expected impacts of planning activities are depicted in a qualitative manner by showing how they affect the mobility opportunities of certain groups with specific life circumstance, such as full-time employed single parents, unemployed youths, people in patch-work families with two households etc.

The analysis and scenario tool introduces novelties in two ways: Firstly, it tries to develop a system that helps municipalities to identify measures that improve the situation for different groups of people. Secondly, it explicitly intends to address municipal decision makers instead of focusing on consultants, planners and scientists. Additionally to the development of the tools, a series of workshops is developed in order to support the municipalities in developing mobility visions and designing approaches to reach them.

### C. Methods

Within the project, quantitative and qualitative methods of collecting and analyzing data as well as participatory and

interactive methods are used. This includes an interactive website ([www.alltagsspuren.at](http://www.alltagsspuren.at)) to share and spread people's experiences with active and sustainable modes of transport, which already has been established as part of the project.

Locally qualitative data will be gathered by using the method of social environment analysis. This method includes walks through the municipality in order to analyze spatial and infrastructural conditions as well as vegetation and landscapes, observations or walks and interviews with citizens.

According to the inclusive approach of the project the local data will be reflected with respect to type-descriptions mirroring diverse life-circumstances (e.g. full-time employed single parents or unemployed youths). This should on the one hand raise awareness for certain mobility needs within the municipalities and should, on the other hand, guide planning processes towards inclusion.

### D. Project team

The project team covers a broad range of knowledge and skills in the areas of gender- and diversity-orientated transport and landscape planning as well as mobility management. The following SMEs and universities are part of the consortium: Büro für nachhaltige Kompetenz (Consultancy for Sustainable Competence) B-NK GmbH (gender and diversity expertise in planning and research), akaryon GmbH (environmental informatics), Dr. Roswitha Hofmann – uebergrenzendenken – Forschung & wissenschaftliche Beratung e.U. (social sciences, diversity expertise), Dipl.-Ing. Ralf Dopheide e.U. (coordination of local activities), Institute for Transport Studies of the University of Natural Resources and Life Sciences Vienna and Institute of Transportation, University of Technology Vienna – both as scientific partners.

Amongst other tasks, the interdisciplinary team carrying out the project is assessing the various data provided at the local and regional level that can depict mobility conditions for municipalities comprehensively with minimum effort. Moreover, the project team will be present in the municipalities during the pilot phase, working directly with decision makers and inhabitants to optimize the tools to be developed.

## III. PARTICIPATORY APPROACH

Rather than using a top down approach, the project fosters active participation by integrating the knowledge and experiences of the local population into analysis and project planning. The process components are laid out in a manner that allows, in addition to a thorough analysis, raising the awareness and competence of the inhabitants as well as the political and institutional representatives and decision makers of rural municipalities. Thus they encourage higher participation rates in order to achieve sustainable mobility targets. In co-operation with pre-selected municipalities, the prevailing mobility conditions as well as key indicators, including those measures that support walking and other active modes of mobility have been researched and a web based analyzing- and planning-tool has been developed. For municipalities, the tool offers the possibility to depict local and regional mobility conditions in a comprehensive way. Based on these specific conditions, the

tool provides concrete guidelines on action to be taken by decision-makers to foster sustainable mobility.

### A. Participating municipalities

In order to test the tools developed in the project, a pilot phase has been initiated. Participating municipalities will provide input and feedback to the analyzing tool and especially to the availability of the data required. Moreover, activities (workshops, walks, etc.) in the municipal area will be conducted by the project team, to activate and inform the inhabitants. In the selection of the municipalities consideration is given to a variation of number of inhabitants and environmental conditions.

The following Austrian municipalities take part in the pilot phase.

- St. Veit im Defereggental, The Tyrol: 707 people live in St. Veit im Defereggental. The municipal area is situated in a mountain valley and is therefore to be characterized as peripheral. Conditions for walking and cycling are challenging, as the terrain is partly very steep.
- Hollabrunn, Lower Austria: 6.836 people live in the city of Hollabrunn. The municipal area is 50 kilometers away from Vienna. The landscape is predominantly characterized by flat terrain. Proposition of basic supply is relatively well. [6]

### B. Activation via website [www.alltagsspuren.at](http://www.alltagsspuren.at)

As one approach to encourage participation among the local communities as well as their citizens, an interactive webpage was launched. This activation module should initiate communication and activation processes within the municipalities among their inhabitants and between citizens of different municipalities.

Fig.1: Screenshot [www.alltagsspuren.at](http://www.alltagsspuren.at) (B-NK & project team)



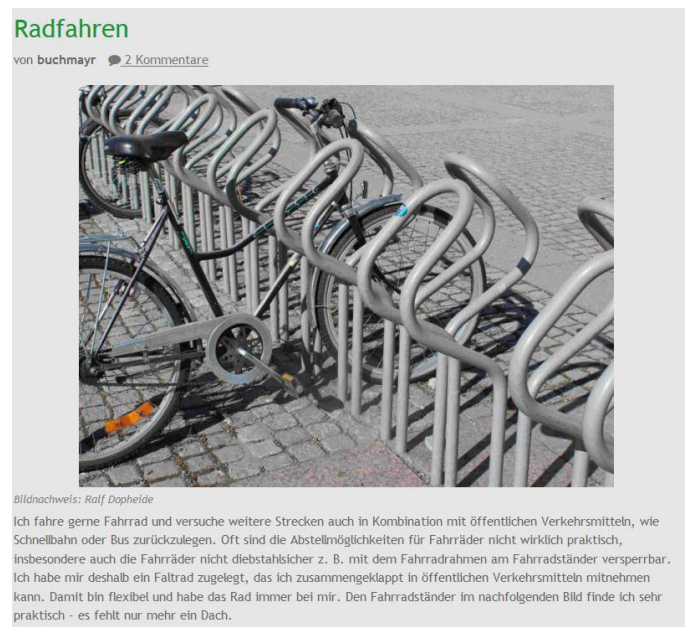
The website provides following features:

- Information about the project and various facts about sustainable modes of transport (e.g. statistics about trip lengths and purposes, political framework and stakeholders in Austria, forms of participation applicable in rural areas);
- The website also provides basic information on the topic of sustainable mobility in rural areas.

- A service section for inhabitants (also initiatives, clubs etc.) of municipalities, where individual stories dealing with sustainable and active mobility and transport modes can be provided (for other inhabitants and decisions makers);
- A digital analysis tool for politicians and local authorities (work in progress);
- A digital scenario tool for politicians and local authorities (work in progress).

The website offers the possibility to provide individual stories dealing with sustainable and active mobility and transport modes. This can be seen as a contribution to the specific local history and helps to visualize knowledge and experience of the “local crowd”.

Fig. 2: Screenshot [www.alltagsspuren.at](http://www.alltagsspuren.at), story written by a user (B-NK & project team)



### C. Activities during the field work

Following activities will be conducted in the municipalities during the pilot phase:

- Social environment analysis;
- Workshops conducted at schools with focus on sustainable mobility;
- Walk-Shop in the municipal area with interested residents and stakeholders;
- Information and awareness-raising evening event for residents about sustainable mobility.

More activities will be designed in further project work.

### IV. DIGITAL WEB-TOOL – ANALYSIS AND SCENARIOS

The digital analysis tool (work in progress) is used to identify and assess the framework conditions for sustainable

mobility within the municipalities. The tool gains its data on both, data from public statistics and data provided by the municipalities. For this purpose, the analysis tool includes a frame where data can be filled in by the administrative staff and analysis outputs can be illustrated.

The dataset includes quantitative variables such as the number of inhabitants, the share of pupils visiting a local school or the number of days with snow cover as well as qualitative variables such as the perceived affinity of the citizens for specific transport modes. The variables are summarized to 36 indicators which are grouped into six categories which are “population”, “spatial patterns and settlement structure”, “transport infrastructure”, “individual mobility: affinity and access to transport modes”, “nature” and “commitment of the municipality to sustainability”. “Spatial patterns and settlement structure” includes e.g. the indicators “population density”, “commuter destinations” as well as the number of shops, facilities for recreation, education or health care.

There are two kinds of indicators: absolute and relative ones. Absolute indicators means that certain facilities are counted to an absolute value such as the number of pubs, restaurants, discos or other leisure facilities within the municipality. Relative indicators are compared with the indicators values of other municipalities. One example is the indicator “share of children below six years” for which the quantiles of reference municipalities are calculated and the municipality at hand is assigned to the quantile it refers to. For both, absolute and relative indicators, the impact of a certain indicator value on the different transport modes is analyzed. The mean is calculated for all indicators belonging to a category.

Within the project, the team has developed some new indicators and innovative key figures, for instance an “indicator for hilliness”, which considers topographical conditions. Further criteria such as quality of paths in terms of constructional design as well as surface types, accessibility to quality of public transport and sidewalk kilometers are also incorporated in the web-tool. Such – new – data did not evolve from mobility surveys. Nonetheless, this data is crucial for comprehensively depicting mobility conditions and can easily be provided by cities and communities. These key figures are used for both, the analyzing tool and the scenario tool. As a further analysis step this figures will be transferred to the view of mobility demands of different groups of persons (e.g. 16 year old pupil, living at home; active senior citizen etc.).

The digital scenario tool (work in progress) is put on top of the analysis tool. A list of measures will be developed, each measure changing the influencing factors for the means of transport and indirectly also changing the situation for each group of people.

At the current stage of the project the requested data is accessible through an excel-based document. The municipalities are requested to give feedback about availability of data. This data framework will be integrated, after the feedback phase, on the website.

Fig. 3: Screenshot excel-based feedback document for local authorities (B-NK & project team)

	Einheit	Eingabewert für Ihre Gemeinde	essentielle Daten nicht verfügbar (ja = x)	Daten schwer zu ermitteln (ja = x)
<b>Bevölkerung</b>				
mit Hauptwohnsitz gemeldet	Anzahl Personen			
Kindergartenkinder/ Hortkinder	Anzahl Personen			
Kindergartenkinder/ Hortkinder (Männlich)	Anzahl Personen			
Kindergartenkinder/ Hortkinder (Weiblich)	Anzahl Personen			
Zu pflegende Personen	Anzahl Personen			
Zu pflegende Personen (Männlich)	Anzahl Personen			
Zu pflegende Personen (Weiblich)	Anzahl Personen			
<b>Prognose der Bevölkerungsentwicklung bis 2030</b>				
Bevölkerung wird schrumpfen (<-9%)	Ja/Nein			
Bevölkerung wird stagnierend (-3% bis +3%)	Ja/Nein			
Bevölkerung wird wachsend (+3 bis +9 %)	Ja/Nein			
Bevölkerung wird stark wachsend (>+9 %)	Ja/Nein			
<b>Menschen mit Behinderungen</b>				
Gehörbehinderung	Anzahl Personen			
Sichtbehinderung	Anzahl Personen			
Gehirnbehinderung	Anzahl Personen			
<b>Raum- und Siedlungsstruktur, Infrastruktur, zentralörtliche Einrichtungen</b>				
Gebietsfläche	Fläche in km <sup>2</sup>			
Siedlungsfläche (Bauland nach Flächennutzungsplan)	Fläche in km <sup>2</sup>		x	
Fläche Dauerwohnraum (Bauland, Verkehrsfläche und Landw. Nutzfläche)	Fläche in km <sup>2</sup>		x	
<b>Siedlungs- und Zentrenform</b>				
Gemeinde mit mehreren Ortschaften mit einem gemeinsamen	Ja/Nein		x	
Gemeinde mit mehreren Ortschaften mit jeweils eigenem Geschäftszentrum	Ja/Nein		x	
Gemeinde mit mehreren Ortschaften ohne Geschäftszentrum	Ja/Nein		x	
Solitäre Gemeinde (nur eine Ortschaft) ohne Geschäftszentrum	Ja/Nein		x	
Solitäre Gemeinde (nur eine Ortschaft) mit mindestens einem	Ja/Nein		x	
Versorgungs- oder Geschäftszentren in der Gemeinde	Anzahl			
Gebäude in der Gemeinde	Anzahl		x	

As a result, the tools will be tailor-made for the purposes, capabilities and needs of municipalities. The algorithms used in the web-tool, produce results which illustrate different realities of various socio-economic groups within the community.

## V. EXPECTED RESULTS

In future, the web based analyzing- and planning-tool, which is developed and tested within the project “AlltagsSPUREN“ will be available as a service for all Austrian municipalities. The tool allows combining, displaying and comparing data on local and regional conditions on the one hand, and providing detailed data on active sustainable mobility on the other hand. Thus the tool supports municipalities to carry out an in-depth analysis of their walking conditions on a local level as well as to derive directions for implementing more active and sustainable forms of mobility.

This project offers a tool for decision-makers in municipalities, who want to develop mid- and long-term innovative solutions in the area of active mobility and the relevant change processes, a form of optimized support with the aid of ICT tools.

## VI. OUTLOOK

The project started in October 2014 and will be completed in September 2016. The interactive, web-based platform for the activation of the municipalities’ population has already been established. Currently, we are working on the analyzing tool, which will be tested in two Austrian municipalities over the next few months.

At the conference in September 2015 we will present the participatory approach of the project as well as the already finalized web-platform and a draft version of the digital analyzing tool.

## ABOUT THE AUTHORS

Dipl.-Ing. Dr. Bente Knoll works as a self-employed landscape and transport planner, consultant and social media designer. The focus of her professional work as managing director of Büro für nachhaltige Kompetenz (Consultancy for Sustainable Competence) B-NK GmbH is to integrate gender

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Dipl.-Ing. Georg Spreitzer holds a Master Degree in Environment and Bio-Resources Management and works as project coordinator and researcher at Büro für nachhaltige Kompetenz (Consultancy for Sustainable Competence) B-NK GmbH. His special interest is fostering sustainable development as well as empirical research using quantitative and qualitative methods.

Dipl.-Ing. Teresa Schwaninger holds a Master Degree in Spatial Planning and a Bachelor Degree in Geography. She works as project coordinator and researcher at Büro für nachhaltige Kompetenz (Consultancy for Sustainable Competence) B-NK GmbH. Her special interest are gender issues in mobility research as well as participatory research using quantitative and qualitative methods.

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Dr. Roswitha Hofmann is sociologist and lecturer at the WU Vienna and the University of Applied Sciences Wiener Neustadt. Her research focus is on diversity and inclusion issues in organizations and sustainability under diversity perspective. She has conducted field studies in Austria and internationally. She has published a number of articles in peer reviewed journals as well as in applied media and edited books. Since 2011 Roswitha Hofmann has been owner of „uebergrenzendenken“ – Forschung & wissenschaftliche Beratung e.U.

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