



Transfer of LIFE LOCAL ADAPT Products and Services - **Guidance Document** -

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Guidance Document

Participating Project Partners & Acknowledgements

LIFE
LOCAL | Integration of climate change adaptation
ADAPT into the work of local authorities



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Region North-West in Czech Republic:
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Guidance Document

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Transfer of LIFE LOCAL ADAPT
Products and Services

Introduction - Transfer Concept

Guidance Document

Introduction

Climate change adaptation (CCA) is a demanding challenge for small and medium-sized municipalities as these usually have a lack of (i) knowledge on climate change (CC), (ii) identifying specific threats at the local level, and (iii) personnel and financial capacities to additionally integrate CCA into their administrative practice and implement necessary measures. Nevertheless, in many European countries, municipalities have the responsibility for building, maintaining and adapting local infrastructure, either at the city level or at the level of regional planning authorities. LIFE LOCAL ADAPT has striven towards meeting these needs. In order to improve the resilience of European municipalities and regions to adverse negative impacts of climate change such as heavy rain, heat and drought, the four key objectives of LIFE LOCAL ADAPT were:

- To improve the data and information base on climate change impacts
- To enhance the knowledge of municipalities on climate change adaptation
- To integrate of climate change adaptation into the administrative practice of local authorities
- To implement specific climate change adaptation measures in cooperation with municipalities

To realize the implementation of specific measures at the local level, municipal knowledge and capacities must be increased first. Updated data and information on climate change impacts, risks and vulnerabilities are a prerequisite to a profound knowledge transfer that enables decision-makers to make the right decisions and to integrate climate change adaptation into their administrative practice.

Support for best practice examples of climate change adaptation is often a necessary additional incentive. To achieve these ambitious goals, a variety of activities needs to be carried out, including an identification of specific risks and vulnerabilities at local levels (and respective methods to do so) and/or information on data availability and the subsequent use. It also includes the organisation and implementation of various stakeholder engagement activities to understand the administrative routines and decision-making contexts and to co-design and co-develop adaptation measures.

Guidance Document

Objectives

Project action C11 aimed to ensure replicability & transferability (R&T) of the results of the project LIFE LOCAL ADAPT to other regions and countries of Europe. Besides long-term sustainability, R&T is a central issue for the promotion of the LIFE programme which is mandatory to all LIFE projects. R&T is mainly characterised by two items (EU Commission):

- They go beyond dissemination of project results and sharing of knowledge
- They include activities and approaches integrated in project actions which aim to facilitate the replication and/or transfer of the project results beyond the project, including other sectors, regions or countries.

Therefore, activities related to R&T also substantially contribute to the EU added value of projects. The general items of R&T were already considered and practiced during the course of the project LIFE LOCAL ADAPT. CCA measures were replicated in other municipalities or transferred to other regions.

Many of the adaptation measures require cross-sectoral approaches, for example combining water management with the built environment or the health sector, etc. Further, LIFE LOCAL ADAPT has already operated in four countries of the EU with different national or regional regulations and different stages regarding the promotion and mainstreaming of CCA. Thus, practical experiences made during the project directly serve to improve general recommendations and means for replicability and transferability after the project phase.

The guidance document is intended to provide municipalities and authorities with simple instructions on how selected products and services from the LIFE LOCAL ADAPT project can be transferred to other regions and countries. The transfer of selected products and services is demonstrated in each chapter through the best practice examples.

Guidance Document

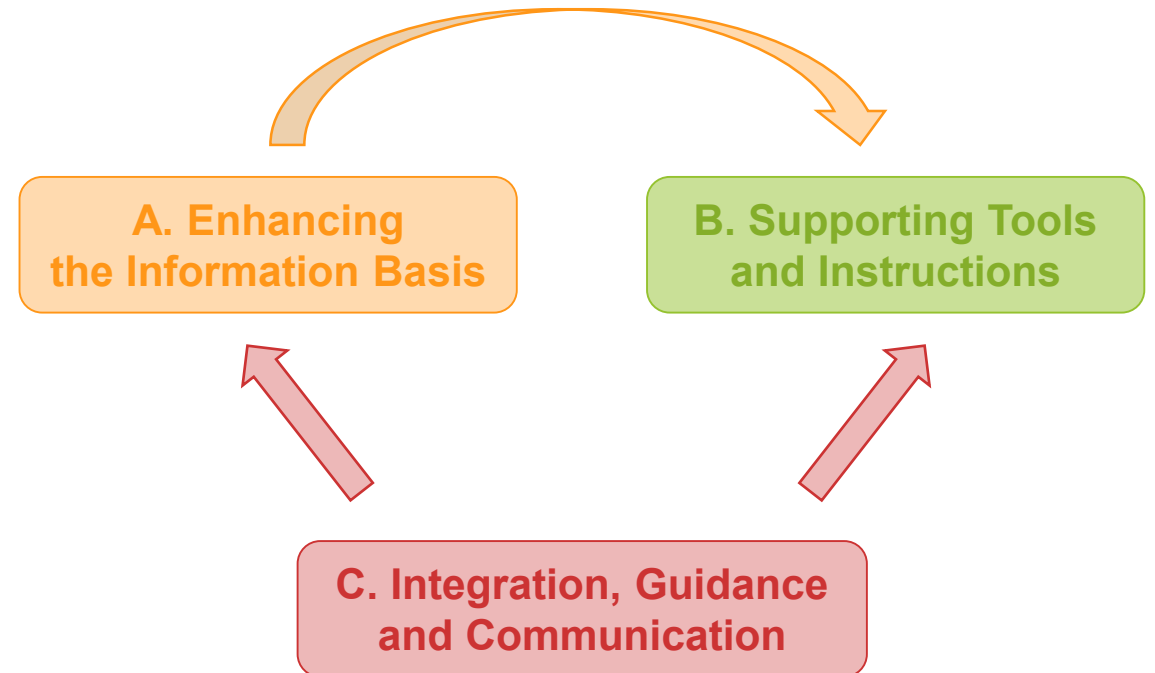
Transfer Concept

The transfer concept consists of three different modules named according to their purpose and contains various CCA products and services: [Enhancing the Information Basis](#); [Supporting Tools and Instructions](#); [Integration, Guidance and Communication](#)

The transfer process works as follows:

1. The municipality or authority has to define its need for CCA.
2. The current level of knowledge regarding the defined CCA must be determined.
3. In case that the level of knowledge is insufficient, a product or service from **Module A** is selected.
4. After the selection of the respective product or service from **Module A**, or when the level of knowledge is sufficient, a product or service from **Module B** is chosen to establish the CCA measure.
5. In case of need for guidance of the selected CCA measures, a service from **Module C** is chosen.

Best practice products and services in the different modules are described in a “How to establish...”-style in this guidance document.



Transfer of LIFE LOCAL ADAPT
Products and Services

Part A – Enhancing the Information Basis

Enhancing the Information Basis

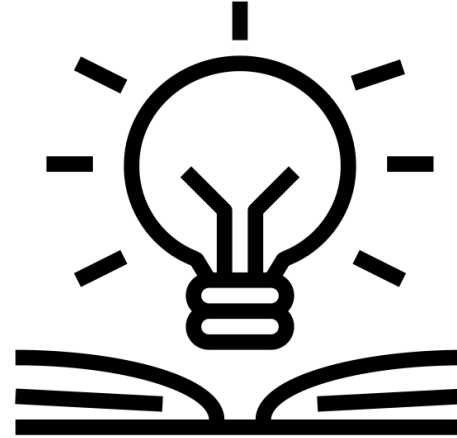
Content

Best Practice:

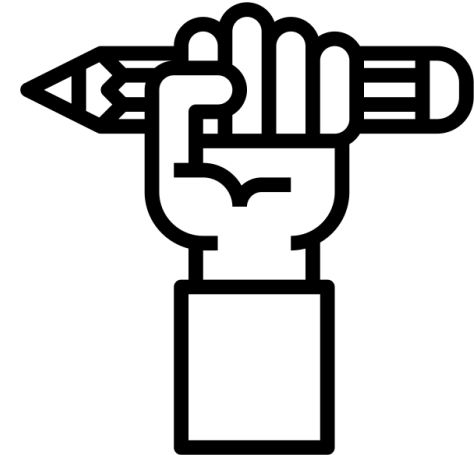
- Local Climate Fact Sheets
 - Experiences
 - Problems and Solutions

More Products and Services:

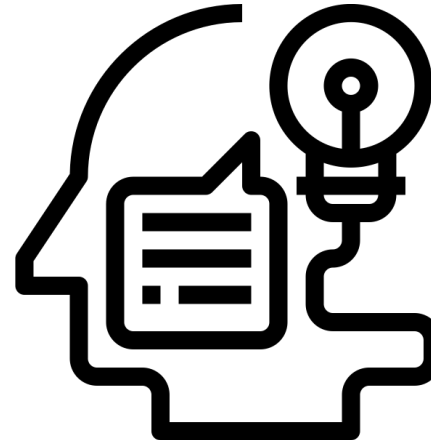
- Regional Climate Fact Sheets
- Heavy Rain Fact Sheets
- Heat Stress Fact Sheets
- Funding Opportunities Fact Sheets



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Part A

Enhancing the Information Basis

***Best Practice:* Local Climate Fact Sheets**

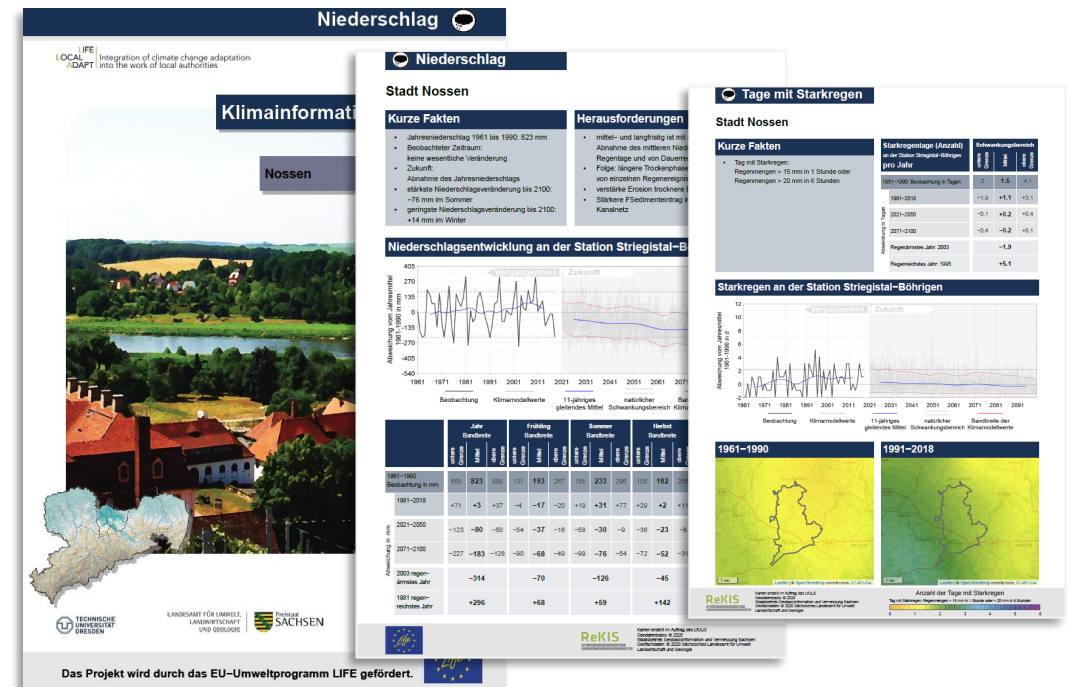
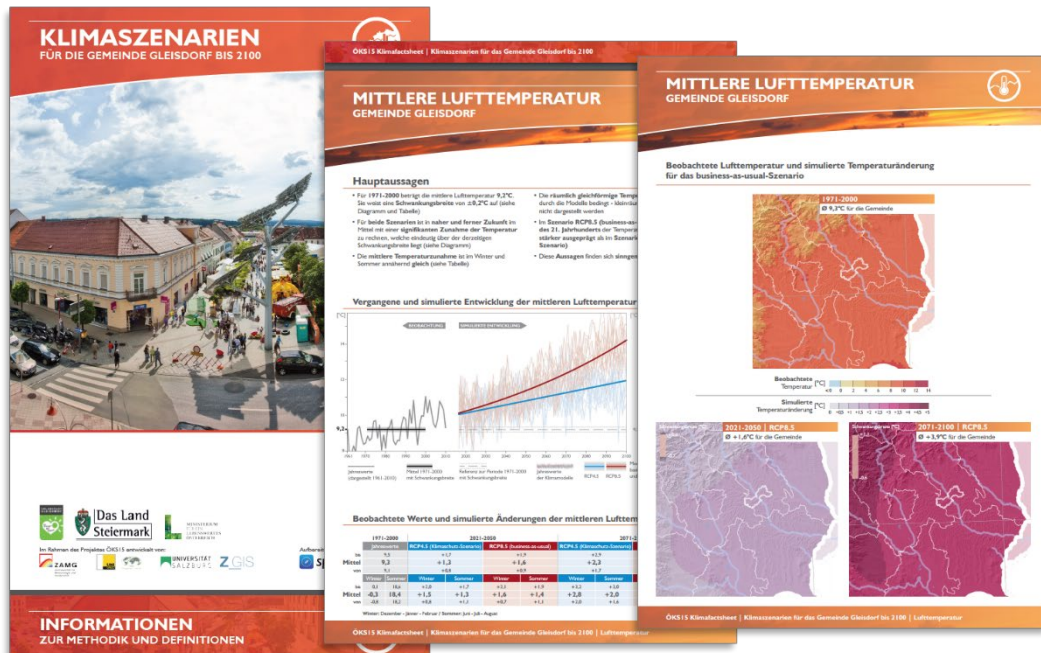
Enhancing the Information Basis

Best Practice: Local Climate Fact Sheets

Local climate fact sheets provide information on past, present and future climate indicators for specific municipalities. Relevant indicators such as summer days, hot days, cooling degree days, heavy rain days, max. daily precipitation were identified for this purpose. The indicators were analysed for different regional climate scenarios, which are based on the Representative Concentration Pathways (RCPs) such as 4.5 and/or 8.5,

describing various greenhouse gas concentration trajectories (Moss et al. 2010). The scenarios cover a period from the past to 2100. The regional climate model data are provided by [EURO-CORDEX](#) and were specifically prepared (interpolated and bias-corrected) for the municipalities.

Contact: [LfULG](#)



Enhancing the Information Basis

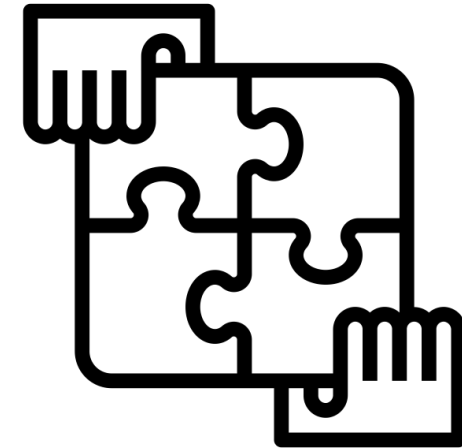
Best Practice: Local Climate Fact Sheets

▪ How to create Local Climate Fact Sheets?

Expert knowledge is required for the development of local climate fact sheets. This knowledge is provided by climate service centres or by national weather services. The development process should go through the following steps:

1. Involvement of potential users
2. Selection of target region
3. Selection of indicators
4. Selection of emission scenarios
5. Selection of reference and scenario period(s)
6. Selection of an appropriate database
7. Conducting the analysis
8. Choosing a user-friendly illustration and explanation of the results
9. Publishing of local climate fact sheets

The above steps are described in more details on the following pages:



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Enhancing the Information Basis

Best Practice: Local Climate Fact Sheets

Development steps of Local Climate Fact Sheets

1. Involvement of potential users:

In order to create a local climate fact sheet that meets the requirements of municipalities or authorities, it is advisable to involve them in the development process from the very beginning. This ensures that the actual needs are met. Potential workshops are described in Part C.

2. Selection of target region:

The selection of the target region depends on the needs of the user and the availability of climate data. The target region can be a federal state, an administrative area of a municipality or a larger city. However, climate data in suitable spatial and temporal resolution should be available for the selected area. If this is not the case, the existing data has to be brought to a higher resolution by statistical or dynamical downscaling (see step 6).

3. Selection of indicators:

Decisive elements of a local climate fact sheet are climate indicators, which should be selected according to the needs of the users. However, the choice of indicators may be limited by the available climate data (see step 6). There are different physical climate indicators, which can be categorized as temperature and precipitation based indicators or miscellaneous indicators. A selection of indicators is listed in the following table.

Enhancing the Information Basis

Best Practice: Local Climate Fact Sheets

Development steps of Local Climate Fact Sheets

3. Selection of indicators (continuation):

Table of possible indicators

Temperature	Precipitation	Miscellaneous
Daily/monthly mean temperature	Daily/monthly mean precipitation	Beginning of vegetation period
Daily/monthly minimum and maximum temperature	Daily/monthly minimum und maximum precipitation	Sunshine duration
Number of summer days	Number of days with extreme precipitation (95 th and 99 th percentile)	Climatic water balance
Number of hot or tropical nights	Total sum of extreme precipitation (95 th and 99 th percentile)	Wind speed
Number of days of great heat	Number of periods of droughts	Sultriness
Number of cooling degree days	Number of dry or wet days	
Number of heating degree days		

Enhancing the Information Basis

Best Practice: Local Climate Fact Sheets

Development steps of Local Climate Fact Sheets

4. Selection of emission scenarios:

Climate change projections performed by global and regional climate models require assumptions about possible anthropogenic emissions in the future. There are four Representative Concentration Pathways (RCPs), which describe the trajectory of atmospheric greenhouse gas concentrations by the end of the century: RCP2.6, RCP4.5, RCP6.0 and RCP8.5 (Moss et al., 2010). The numbers indicate the radiative forcing relative to pre-industrial conditions at the end of the century.

For practical applications, RCP8.5 is considered as pathway for a "business as usual" scenario with high greenhouse gas emissions, RCP4.5 as "medium" scenario with a medium amount of greenhouse gas emissions, and RCP2.6 as "climate protection" scenario with smaller or even negative greenhouse gas emissions.

5. Selection of reference and scenario period(s):

To calculate the climate change signal, a past reference period and a scenario period located in the future must be defined. Each climate period should encompass 30 years according to the [climate definition](#) of the WMO. Typical reference periods are 1971-2000 or 1981-2010. Scenario periods are pointing usually to the middle (2036-2065) or to the end (2071-2100) of the century.

Enhancing the Information Basis

Best Practice: Local Climate Fact Sheets

Development steps of Local Climate Fact Sheets

6. Selection of an appropriate database:

The choice of suitable climate data in terms of spatial and temporal resolution is the key to a reliable assessment of climate change in a given region or area. Climate data can be distinguished between observational data, which are measurements from the past, and climate model data, which are produced by climate models driven by reanalysis data or climate projections.

For local climate fact sheets, it is recommended to use an ensemble of climate projections from Regional Climate Models (RCMs) because they offer a higher spatial and temporal resolution than Earth System Models (ESMs) and henceforth more reliable results. In case that the spatial resolution is still too coarse for the chosen area, an advanced method such as Empirical Statistical Downscaling (ESD) can be applied for further refinements of the spatial resolution. In addition, some climate model data must be bias-corrected depending on the analysis method.

The spatial resolution of the climate data must match the spatial extent of the respective area. For example, in the case of gridded climate data, more than one grid box should be located in the region or area of interest. Ideally, at least nine grid boxes are used to calculate the mean value of the area, since the model is not point-precise for numerical reasons and to avoid outliers. The choice of the temporal resolution of climate data depends on the selected climate indices. Most climate indicators require daily resolved data such as summer days or dry days.

Enhancing the Information Basis

Best Practice: Local Climate Fact Sheets

Development steps of Local Climate Fact Sheets

6. Selection of an appropriate database (continuation):

Regional observational climate data are provided by national weather services or by other institutions, e.g.:

- [Climatic Research Unit \(CRU\)](#)
- [E-OBS](#)
- [Global Precipitation Climatology Centre \(GPCC\)](#)

Regional climate projections are calculated by various institutions in collaborations and collected in data portals, e.g.:

- [Earth System Grid Federation \(ESGF\)](#)
- [Copernicus Climate Data Store](#)

7. Conducting the analysis:

For the assessment of the past climate, observational data from measurements at local stations or gridded products are used. To obtain reliable climate change signals, it is recommended to base the analysis on a large ensemble of regional climate projections. This also includes uncertainty and a robustness estimate of the results, e.g. by specifying the bandwidths (maximum minus minimum) of a variable or the 10th or 90th percentile calculated from the model ensemble. For this purpose, a variety of software and programming languages are available to perform the analysis, such as the [Climate Data Operators \(CDO\)](#), Python, R, MATLAB or bash scripts on Linux-based operating systems.

Enhancing the Information Basis

Best practice: Local Climate Fact Sheets

Development steps of Local Climate Fact Sheets

8. Choosing a user-friendly illustration and explanation of the results:

For user without specific knowledge in climate science, it is important to present the content of the fact sheets in a comprehensible way. It is therefore recommended to involve the target users in the presentation of the content as well. This can take the form of symbols, maps or different colours indicating the change in a climate variable for the period under consideration. Moreover, it may also be helpful for the user to provide guidance on how to read and interpret the information on climate change presented in the fact sheets.

9. Publishing of local fact sheets:

- a) As printouts useful for workshops and conferences
- b) As PDF versions that can be distributed online on websites and by e-mail.

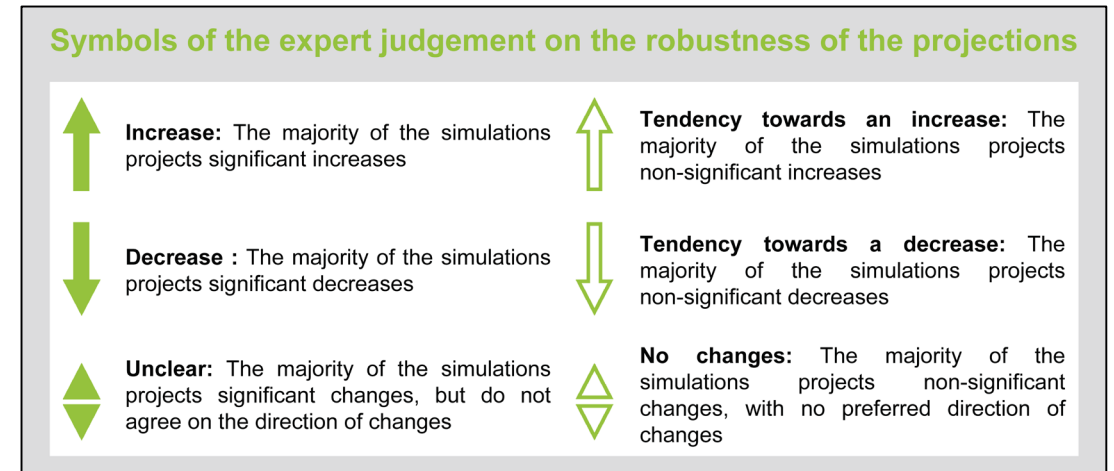
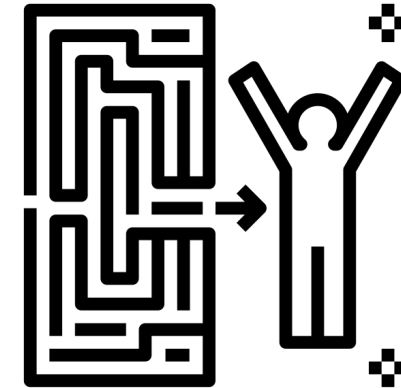


Figure: User guide how to interpret the symbols describing the climate change signals. This example was taken from a Regional Climate Fact Sheet.

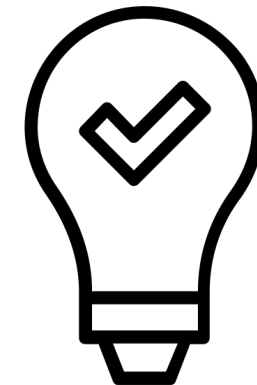
Enhancing the Information Basis

Best Practice: Local Climate Fact Sheets

- **What experience has been gained in the creation and use of this product?**
 - Involvement of the target group is elementary in the creation process of the fact sheets.
 - Understanding the needs of the target groups is necessary.
 - Local climate fact sheets provide a good knowledge base for discussions in workshops and the development/prioritization of CCA measures.
 - Local climate fact sheets raise awareness of the need for CCA measures.
- **What kinds of problems can occur during the transfer?**
 - Lack of an appropriate database, i.e. a too low spatial and temporal resolution of observational or regional climate projection data. *Solution:* Application of dynamical or statistical downscaling. Its probably time consuming and expensive and the help of experts is vital.
 - Guidance during the selection of indicators may be needed. *Solution:* Use easy to understand indicators like heat days, rainy days or other indicators such as the percentage of dead trees in the last two years.
 - The local climate fact sheets may not be understandable for the target groups. *Solution:* Usage of agreed indicators and an understandable presentation of the results (avoid specific scientific terms).



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Part A

Enhancing the Information Basis

More Products and Services

Enhancing the Information Basis

Regional Climate Fact Sheets

A regional climate fact sheet provides brief and concise information on past, present and future climate developments for a specific region. It is based on the analysis of observational data and an ensemble of regional climate model simulations. This information can be used to support the decision-making process for adaptation measures to climate change.

For LIFE LOCAL ADAPT, regional climate fact sheets were produced for four different regions in European countries and contain:

- 18 different climate change indicators relevant to various societal sectors
- Three different emission scenarios: "business-as-usual" (RCP8.5), "medium" (RCP4.5) and "climate protection" (RCP2.6)
- Expert judgement on the reliability of the changes shown, such as robustness, agreement of the projections on the sign and statistical significance.

The development process of regional climate fact sheets is similar to that described for a local climate fact sheet.

PDF-versions of regional climate fact sheets can be found at the website of LIFE LOCAL ADAPT.

Contact: GERICS

Indicator	Business-as-usual (RCP8.5)	Medium (RCP4.5)	Climate protection (RCP2.6)	Details
Summer days	increase	increase	increase	EE: 4, 11
Winter days	decrease	decrease	decrease	EE: 5, 14
Frost days	decrease	decrease	decrease	EE: 5, 14
Days with 0°C	decrease	decrease	decrease	EE: 5, 11
Days with 5°C	increase	increase	increase	EE: 5, 11
Days with 10°C	increase	increase	increase	EE: 5, 11
Days with 15°C	increase	increase	increase	EE: 5, 11
Days with 20°C	increase	increase	increase	EE: 5, 11
Days with 25°C	increase	increase	increase	EE: 5, 11
Days with 30°C	increase	increase	increase	EE: 5, 11
Days with 35°C	increase	increase	increase	EE: 5, 11
Days with 40°C	increase	increase	increase	EE: 5, 11
Days with 45°C	increase	increase	increase	EE: 5, 11
Days with 50°C	increase	increase	increase	EE: 5, 11
Days with 55°C	increase	increase	increase	EE: 5, 11
Days with 60°C	increase	increase	increase	EE: 5, 11
Days with 65°C	increase	increase	increase	EE: 5, 11
Days with 70°C	increase	increase	increase	EE: 5, 11
Days with 75°C	increase	increase	increase	EE: 5, 11
Days with 80°C	increase	increase	increase	EE: 5, 11
Days with 85°C	increase	increase	increase	EE: 5, 11
Days with 90°C	increase	increase	increase	EE: 5, 11
Days with 95°C	increase	increase	increase	EE: 5, 11
Days with 100°C	increase	increase	increase	EE: 5, 11

Enhancing the Information Basis

Heavy Rain Fact Sheets

A fact sheet on heavy rain provides measures and recommendations for municipalities in a brief and understandable manner and is available in different national languages. It supports the adaptation process from the very beginning.

The fact sheet contains:

- Impacts of heavy rainfall and objectives of adaptation measures
- Recommendations for the approach and the involvement of actors
- Adaptation measures

The measures are divided into the creation of maps, plans, strategies, information material and constructional measures. In addition, a good praxis example and literature recommendations are presented.

PDF-versions of heavy rain fact sheets can be found at the website of [LIFE LOCAL ADAPT](https://www.life-local-adapt.eu).

Contact: [TUD](https://www.tud.de)

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Integration of climate change adaptation into the work of local authorities

Factsheet Heavy Rain

Strategies, Maps, Plans, Information

Approach

For each endangered area, it is recommended to clarify the local conditions and to develop a strategy coordinated with all parties and actors involved.

1. Hazard analysis
2. Risk assessment
3. Strategy and action plan
4. Monitoring

Strategy and action plan

Comprehensive and systematic analysis is the basis for successful implementation
Implementation: municipality

Flood risk maps

These maps show the flooding areas in the event of heavy rainfall, for example if the sewer system is overloaded. Critical infrastructures and sensitive facilities are taken into account.
Implementation: municipalities

Risk management, emergency and deployment plans

Minimizing the damage by raising awareness and behavioral prevention and clearly responsibilities in case of an event.
Implementation: municipalities

Strategy and measures to protect critical infrastructures

Maintaining supply and public safety
Implementation: municipalities

Adaptation of land utilization and urban land use planning

Minimization of damage through planning and control of urban development and use of nature-based solutions
Implementation: municipalities

Set up of funding programmes

Assistance to owners (Examples for funding: roof greening, unsealing, rainwater harvesting and infiltration, inspection of private sewage system)
Impl:

Actors

Adaptation to extreme weather conditions is a municipal task in which various actors (local politics, drainage companies, planners, property owners) must work together. However, this does not guarantee complete protection for private ownership from extreme rainfall events. Therefore, private provision and adaptation measures by citizens are important.

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Measures and Recommendations

Problem

Climate observations and model calculations show that climate change leads to higher temperatures and therefore to more frequent and intensive rainfall events. To mitigate damage from heavy rainfall events there are two strategies that must go hand in hand:

1. Reduction of greenhouse gas emissions (climate protection - mitigation)
2. Increase of resilience through measures (climate adaptation)

Objectives of Adaptation Measures

- Estimation of hazard, exposure and potential damage
- Information of residents, instructions for self-provision
- Clarification of responsibilities
- Decreasing vulnerability, increasing flood-resilience, minimizing damage to infrastructure and buildings
- Emergency preparedness and response

What is heavy rain?

- High amount of precipitation in short time (e.g. > 25 l/m² in an hour)
- spatially limited
- short or no warning time

Consequences of heavy rain

Flooding and erosion caused by water runoff, sewage overflow, overload of water bodies and drainage systems, damage to buildings and infrastructure

Příklady adaptační opatření

Přívalové srážky a povodně jsou přirozenými přírodními jevy. Uplná ochrana proti všem extrémním jevům však není možná. Z ekonomických důvodů nemůže být ani systém kanalizací a městského odvodnění navržen s dostatečnou kapacitou pro zachycení těch nejextrémnějších případů se vyplývající události. Z těchto důvodů hrají ve městech důležitou roli protipovodňová opatření, podpora zasakování a další podpůrná opatření, ochrana obyvatelstva, budovy a městskou infrastrukturu.

Budování suchých poldrů a retenčních nádrží

Obnova a zřizování postranních ramen, tůň a mokřadů

Obnova a zřizování postranních ramen, tůň a mokřadů

Během letních měsíců slouží jako přírodní protipovodňová opatření, zlepšují kvalitu vody, zvyšují druhovou rozmanitost a znižují vliv městského tepelného ostrova díky odpařování přítomné vody.

Zvýšení podílu ploch s propustným povrchem

Běžné městské umělé povrchy nemožňují infiltraci vody do půdního profilu a při extrémních srážkových událostech. Naopak vegetační tvárnice, porézni dlažba, štrkové trávníky a další propustné povrchy průsak srážkové vody umožňují a díky tomu přispívají k ochlazení vzduchu výparem a snižují nápor na kanalizační síť.

Zachytávání a využívání srážkové vody

Opatření využívající zachycenou srážkovou vodu můžou být tak jednoduchá, jako jsou jezírka nebo barely sbírající vodu ze střechy pro závlahu zeleně, nebo složitější jako systémy akumulující vodu v podzemních nádržích a využívající ji uvnitř budov namísto pitné vody pro splachování toalet, vytírání podlahy, mytí auta, apod.).

EU-Project LIFE LOCAL ADAPT - Adaptation to Climate Change in Municipalities

Enhancing the Information Basis

Heat Stress Fact Sheets

A fact sheet about heat stress provides brief information about one of the growing problems for municipalities in Central Europe. It gives general information to local stakeholders about the impacts of heat stress, about appropriate indicators and explains why should municipalities be aware of heat stress.

The fact sheet includes recommendations for:

- Physical measures (e.g. planning and constructing climate adaptive buildings)
- Administrative measures (e.g. establishing monitoring systems concerning climate-related illness)
- Social measures (e.g. strengthening volunteer work and neighbourhood assistance) as well as good practice examples from municipalities.

PDF-versions of heat stress fact sheets can be found at the website of [LIFE LOCAL ADAPT](https://www.life-local-adapt.eu).

Contact: [Provincial Government of Styria](https://www.styria.gv.at)

Faktenblatt Hitzstress

Maßnahmen und Empfehlungen

Klimaschutz und Anpassung gemeinsam denken

Klar ist: Anpassung kuriert nur die Symptome des Klimawandels, während Klimaschutz die Ursache bekämpft. Ist ein Patient jedoch lebensgefährlich erkrankt, müssen kurzfristig die Symptome (die Klimafolgen) gelindert werden: das leistet die Anpassung. Parallel dazu müssen jedoch auch die Ursachen (die Treibhausgasemissionen) bekämpft werden: das leistet der Klimaschutz.

Physikalische Maßnahmen

Erhalt und Schaffung von Kalt- und Frischluftentstehungsgebieten
Durch Grün- und Wasserflächen (z. B. Parks, Sport- und Spielplätze, Teiche, Gärten) wird durch Verschattung und Verdunstung Kalt- und Frischluft generiert. Das trägt zur Minderung der örtlichen Hitzebelastung bei.

Verstärkte Sicherung von ökologisch bedeutsamen Freiräumen
Vermeidung der weiteren Zerstückelung von Freiraumgebieten, um deren biologische Vielfalt sowie Frischluftspeicher nicht zu verlieren. Ökologisch bedeutsame Freiräume (unzerschnittene naturnahe Räume, Lebensraumkorridore, Biotopvernetzung) sollen erhalten bleiben.

Reduzierung und Geringhaltung des Versiegelungsgrads
Versiegelte Flächen führen durch ihre hohe Wärmespeicherkapazität zur übermäßigen Erwärmung des Ortes. Durch Entseelung der Flächen können Erwärmungseffekte eingedämmt werden.

Planung und Bau von klimaangepassten Gebäuden
Durch die Errichtung von an den Klimawandel gut angepassten Gebäuden kann die sommerliche Überhitzung der Innenräume bei vermehrtem Auftreten von Hitzetagen vermieden werden.

Dach- und Fassadenbegrünungen
Positive Beeinflussung des Mikroklimas (Synergieeffekte: Abflussverzögerung bei Starkregen, Verbesserung der Luftqualität)

Faktenblatt Hitzstress

Administrative Maßnahmen

Rechtliche Grundlagen und Anreize zur Reduktion von Wärmeisoleffekten
Durch gesetzliche Verankerung und entsprechende Anreize sollen bei Neubauten und bestehenden Gebäuden zukünftig genügend begrünte Freiräume, Beschattungsfächen und Dachbegrünungen geschaffen werden.

Potentialanalyse für Fassaden- und Dachbegrünung
Vermeidung von Überwärmung in Ortskernen

Freiwilligenarbeit und Nachbarschaftshilfe
Motivation erhöhen, sich freiwillig zu engagieren

Hitzewarnsystem
Rasche und flächendeckende Information der Bevölkerung im Katastrophenfall

Bildungsoffensive zu Klimawandel und Gesundheit
Informationen der Bevölkerung mittels Öffentlichkeitsarbeit zur Schaffung eines entsprechenden Problembewusstseins

Informationen über Funk und Fernsehen, Faltblätter und Telefonhotlines
Allgemeine Hinweise zur Vermeidung von Hitzestress für die breite Öffentlichkeit

Trinkbrunnen im öffentlichen Raum
Reduzierung der Hitzebelastung, kostenlose Erfrischung (Synergie: Einsparung von Plastikflaschen)

Maßnahmen und Empfehlungen bei Hitzestress

Mehr Hitzetage durch Klimawandel?

Die jährliche Mitteltemperatur in Europa ist von 1850 bis 2008 um 1,3 °C gestiegen. Die 9 wärmsten Jahre dieses Zeitraums waren innerhalb der letzten 12 Jahre zu beobachten. Parallel dazu nahm die Zahl der warmen Nächte und heißen Tage deutlich zu.

Nach Einschätzungen des IPCC* wird die Zunahme der Lufttemperatur mit hoher Wahrscheinlichkeit mit einer Zunahme von Hitzewellen einhergehen. Dies betrifft sowohl die Häufigkeit, als auch die Andauer dieser Ereignisse.

* Intergovernmental Panel on Climate Change - Weltklimarat

Ziele von Anpassungsmaßnahmen

- Minimierung von negativen gesundheitlichen Folgen durch Hitzestress bei Menschen, Tieren und Pflanzen
- Minimierung von Schäden durch Dürre in der Landwirtschaft
- Klärung von Verantwortlichkeiten
- Bewusstseinsbildung und Information von BürgerInnen

Was ist ein Hitzetag?

Als Hitzetag werden Tage bezeichnet, an denen die Tageshöchsttemperatur 30 °C oder mehr erreicht.

Die Hitzewelle 2003 brachte europaweit 35.000 Todesopfer und galt als eine der größten Naturkatastrophen des Kontinents. Für Nord- und Ostdeutschland war das Jahr 2018 der bisher wärmste Sommer seit Beginn der Messungen. Deutschlandweit war dieser Sommer nach 2003 der zweitwärmste. Teile des Landes litten gleichzeitig unter einer extremen, langanhaltenden Trockenheit.

2003	19,7 °C
2018	19,3 °C
1947	18,5 °C
Referenz Sommer 1961-1990	16,3 °C

EU-Projekt LIFE LOCAL ADAPT – Anpassung an den Klimawandel in Kommunen

TECHNISCHE UNIVERSITÄT DRESDEN, Das Land SACHSEN, CERICCO, CzechGlobe, LANDESBUND FÜR UMWELT UND ENERGIE SACHSEN, LIFE

Enhancing the Information Basis

Funding Opportunities Fact Sheets

Fact sheets about national and European funding present an opportunity for municipalities to potentially finance adaptation measures or other adaptation actions. These measures and actions are selected and prioritized by stakeholders and based on regional climate, local climate and vulnerability analyses and the needs of each municipality.

Funding fact sheets typically include:

- Short information about a funding program
- Funding rate
- Funding objects
- Funding period
- Links
- Information about funding institute

PDF-versions of funding opportunities fact sheets can be found at the website of [LIFE LOCAL ADAPT](https://www.life-local-adapt.eu).

Contact: [Czech Globe](https://www.czechglobe.eu)

LIFE
LOCAL
ADAPT

Integration of climate change adaptation into the work of local authorities

The image displays a collage of several fact sheets from the LIFE LOCAL ADAPT project. The visible sheets include:

- NOVÁ ZELENÁ ÚSPORÁM**: A fact sheet about energy-saving programs, detailing the National Program, supported projects (renovating buildings, green roofs), and the 'Green Roof' initiative.
- Förderprogramm National**: A sheet about funding for climate adaptation measures, listing focus areas like business adaptation, training, and municipal projects.
- Bewahrung und Sicherung national wertvoller Kulturgüter vor schädlichen Umwelteinflüssen**: A sheet about funding for the preservation of cultural heritage, detailing the program's goals, eligible projects, and the application process.
- Deutsche Bundesstiftung Umwelt (DBU)**: A sheet providing information about the German Federal Environmental Foundation, its mission, and how to apply for funding.

Each fact sheet includes logos for LIFE LOCAL ADAPT, the German Federal Government, the State of Saxony, and the European Union.

Transfer of LIFE LOCAL ADAPT
Products and Services

Part B – Supporting Tools and Instructions

Supporting Tools and Instructions

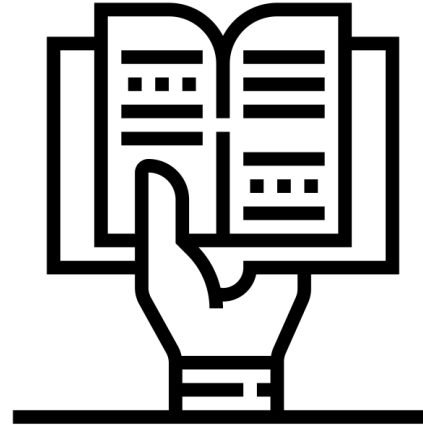
Content

Best Practice:

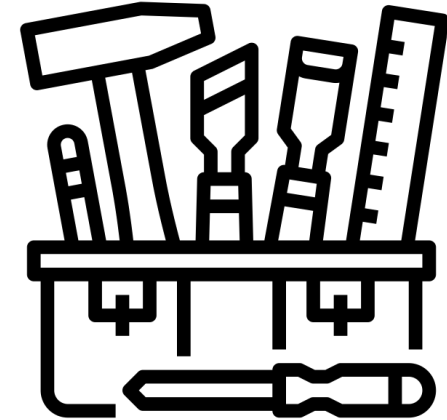
- Identification of Climate Change Adaptation Measures
 - Experiences
 - Problems and Solutions
- Climate Change Adaptation Strategies and Action Plans
 - Experiences
 - Problems and Solutions

More Products and Services:

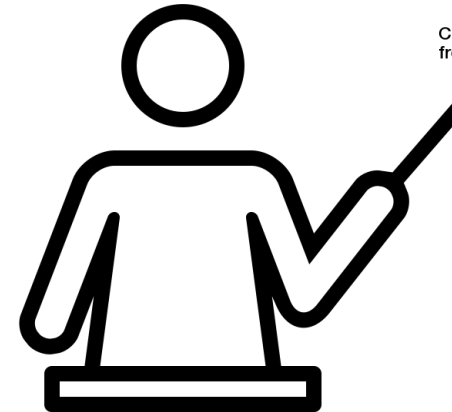
- Data Assessment and Analysis of Climate Change Adaptation
- Risk and Vulnerability Assessment
- Regional Climate Information System (ReKIS)
- Contest on Pilot Measures



Created by Eucalyp
from Noun Project



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from Noun Project



Created by Pham Thi Dieu Linh
from Noun Project

Part B

Supporting Tools and Instructions

Best Practice: Identification of Climate Change Adaptation Measures

Supporting Tools and Instructions

Best Practice: Identification of Climate Change Adaptation Measures

- When starting the process of identifying adaptation measures, the respective current and future climate situation of the municipality must be considered.
- While preparing the identification of adaptation measures, it is helpful to have a local climate or a regional climate fact sheet and to conduct a climate risk analysis relevant to the municipality.
- After the risk analysis, individual adaptation measures have to be discussed together with local stakeholders.
- When developing recommendations for action to adapt to climate change, it is important to consider possible interaction with climate protection efforts and measures. In this way, synergies can be used, potential conflicts avoided or, after weighing up the options, consciously accepted.

Contact: Czech Globe



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Supporting Tools and Instructions

Best Practice: Identification of Climate Change Adaptation Measures

▪ How to identify climate change adaptation (CCA) measures?

1. Performing literature research concerning measures, e.g. using the following sources: [ICLEI Europe](#), [Covenant of Mayors](#), [European Environment Agency](#)
2. Pre-selection of suitable CCA measures for the considered municipality
3. Conducting a participatory workshop with stakeholders to identify and prioritise CCA measures

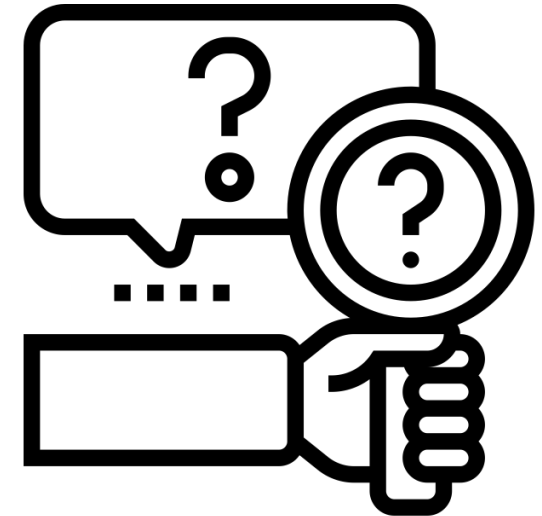
Notice: For a successful accomplishment of this task, the following expert knowledge is essential: *Potential risks and vulnerabilities* of the location, the *effects of various measures* (their benefits and disservices) and the *measures' effects in various urban environments* regarding the different land use surroundings (to maximise synergies and avoid negative trade-offs).

▪ Which supporting tools are helpful in the identification process?

- Analysis of the past, present and potential future climate, e.g. local climate and/or regional climate fact sheets
- Consultation of climate coaches (if existing) or authorities/ institutions with specific expertise
- Interviews and discussions with stakeholders

▪ How can the results be presented?

- Workshops, reports, leaflets and websites

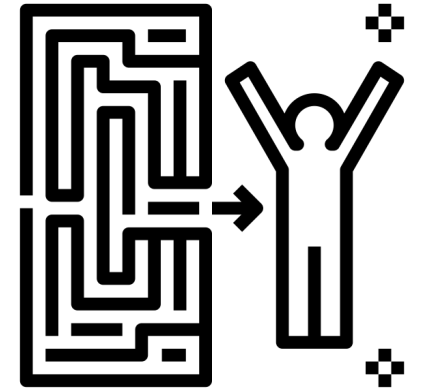


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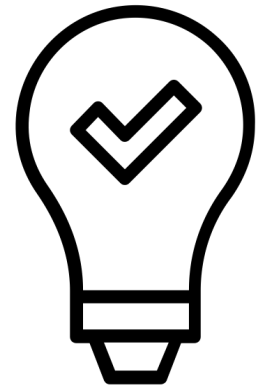
Supporting Tools and Instructions

Best Practice: Identification of Climate Change Adaptation Measures

- **What experience has been gained in the creation and use of this service?**
 - Measures must be compatible with the political and administrative framework and practices. When a measure is unrealistic, overly ambitious, or not sufficiently precise in its formulation, its implementation may not be successful.
 - The legal situation can obstruct the implementation of measures.
 - Results are too complex: in many cases, the outcomes of implemented measures are difficult to assess, especially when the effects become evident only in the long term.
- **What should be considered during the transfer of this service (to other regions/countries with regard to laws, knowledge of CCA)?**
 - The responsible political decision-makers are sometimes not (sufficiently) prepared to push adaptation ahead.
 - Sometimes there is an unclear or inappropriate distribution of competence, responsibilities or an insufficient coordination: The corresponding problems and potential solutions often cannot be clearly assigned to specific actors, sectors, or levels of government.
 - Insufficient cooperation: Political actors demonstrate a little or no cooperation within or among the administrative levels
 - Guarantee of resources: Financial and/or personnel resources may be insufficient
 - When the relevant decision-makers are unaware of the need for adaptation, the corresponding issues and policies will not even make it onto the political agenda.
 - The added value created by adaptation strategies and measures is frequently unclear.



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Part B

Supporting Tools and Instructions

Best Practice: Climate Change Adaptation Strategies and Action Plans

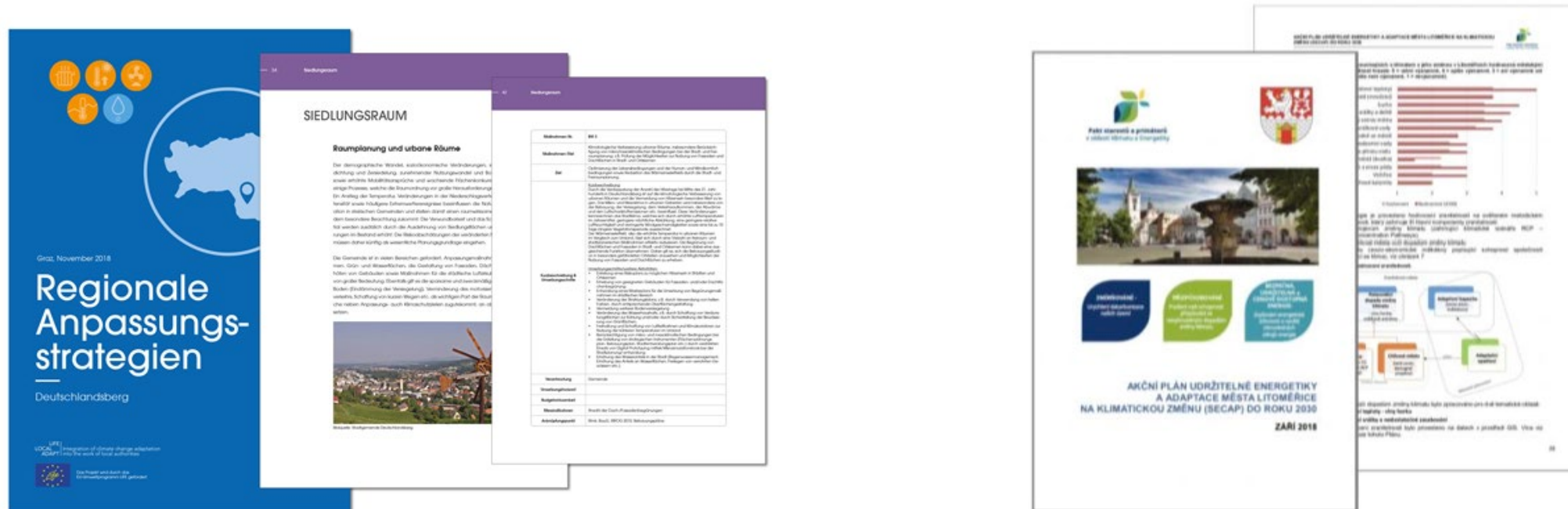
Supporting Tools and Instructions

Best Practice: Climate Change Adaptation Strategies and Action Plans

CCA strategies and plans support stakeholders, decision and policymakers to direct and carry out adaptation actions in a structured and organized way. They are designed to increase the municipality's resilience to climate change and offer solutions to current and future climate-related impacts. An action plan contains climate change adaptation (CCA) measures that were developed in workshops together with the municipalities. A crucial part of an adaptation strategy and/or plan

is to actively involve local stakeholders in the shaping of such a document. It ensures that local knowledge and interests are considered and improves the acceptance and robustness of planned measures and actions.

Contact: [Czech Globe](#)



Supporting Tools and Instructions

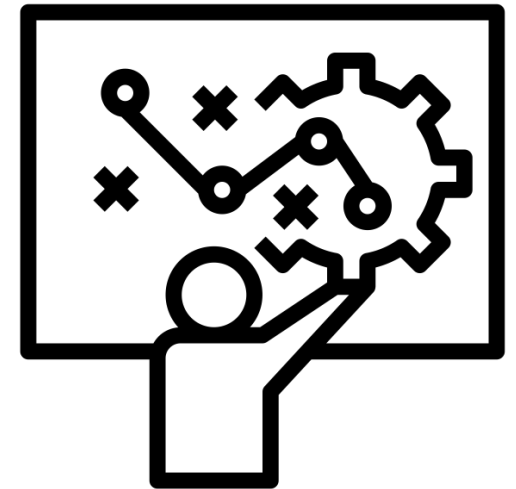
Best Practice: Climate Change Adaptation Strategies and Action Plans

Climate change adaptation (CCA) strategies and action plans should include individual measures from different areas (depending on the issues affecting the municipality):

- Securing the supply (water management and economy, secure energy supply, protection against climate-related natural disasters)
- Settlement area (regional planning and urban areas, building and living, resistant traffic infrastructure)
- Resistant natural areas (agriculture, forestry, nature conservation & biodiversity)
- Economy and tourism
- Health, social and global responsibility
- Information and education

It is important that the respective CCA measures are worked out individually for each municipality. The description of measures should include:

- The aim of the adaptation measure
- A short description of the respective measure
- A description of how the respective action can be implemented (which steps are necessary) and information about who is responsible for the implementation and maintenance.



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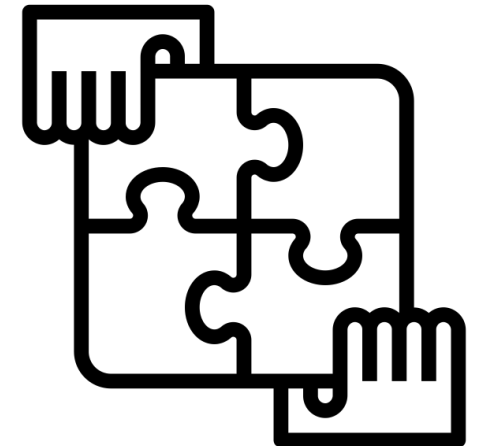
Supporting Tools and Instructions

Best Practice: Climate Change Adaptation Strategies and Action Plans

- **How to create climate change adaptation (CCA) strategies and actions plans?**
 1. Performing a risk and vulnerability analysis, e.g. according to the [“Adaptation Support Tool”](#) on the European CCA platform Climate-ADAPT
 2. Presentation of the vulnerability analysis to stakeholders
 3. Identification of the most alarming problems and risks by the stakeholders
 4. Prioritization of the [CCA measures](#) by the stakeholders
 5. Developing CCA strategies based on the outcome of the vulnerability analysis and a participatory workshop
 6. Consultation with the municipality and presentation of the CCA strategy

Notice: For a successful accomplishment of this task, the following expert knowledge is essential:
Risk and vulnerability assessment and effects of adaptation measures and participatory methods

- **Which supporting tools are helpful in the creation process?**
 - [Local climate and/or regional climate fact sheets](#)
 - [Heavy rain and/or heat stress fact sheets](#)
 - [Contest on pilot measures](#)

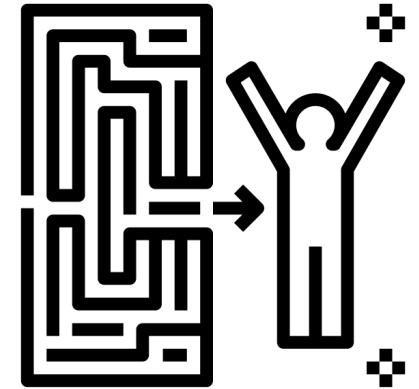


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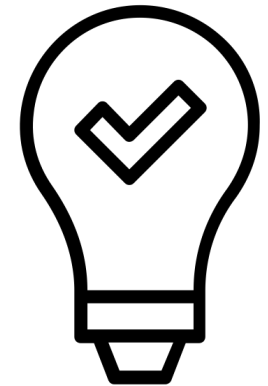
Supporting Tools and Instructions

Best Practice: Climate Change Adaptation Strategies and Action Plans

- **How can the results be presented?**
 - Workshops
 - Fact sheets
 - Webpages
- **What experience has been gained in the creation and use of this product?**
 - A combination of CCA and monetary as well as non-monetary benefits would increase the motivation for CCA strategies and actions plans, e.g. contest on pilot measures or a bonus rate at the funding of CCA.
 - The creation process takes a long time.
 - Implementation of CCA measures is facilitated when all involved partners work together.
- **What kinds of problems can occur during the transfer?**
 - The transfer of the adaptation strategy/action creation should be simple since the process was developed to be flexible and applicable to different contexts.
 - A new prioritisation may be needed according to financial and personnel resources, space requirements and acceptance by the citizens.



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Part B

Supporting Tools and Instructions

More Products and Services

Supporting Tools and Instructions

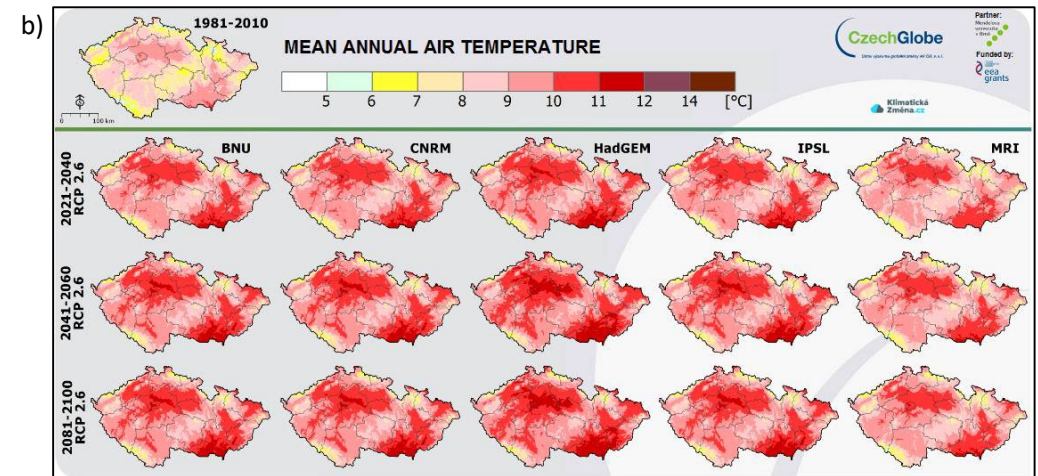
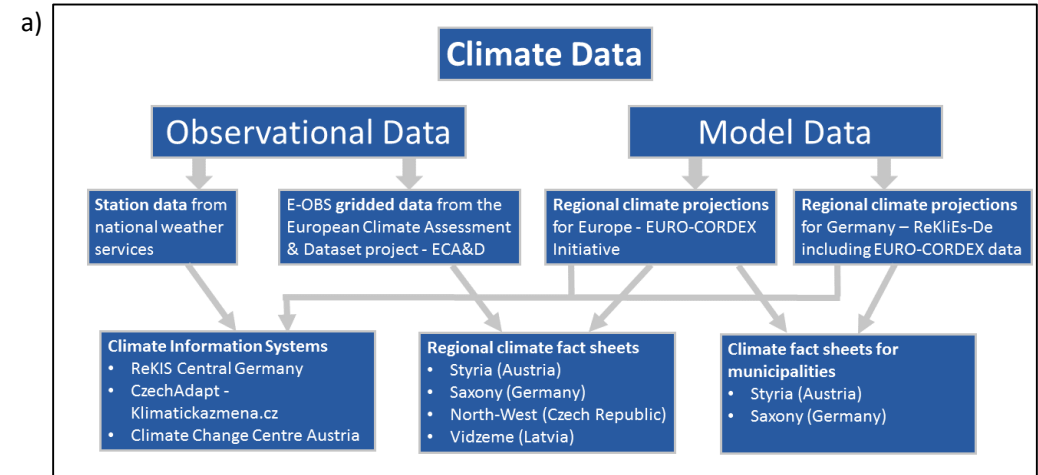
Data Assessment and Analysis of Climate Change Adaptation

Data and information are necessary to plan climate change adaptation (CCA). Decisions on adaptation measures must often consider norms and regulations (e.g., thresholds for the highest acceptable heavy rain for erosion prevention). Thus, an actual data basis (regarding amongst others climatic variables, data about land use and terrain) is a precondition for analysing climate change and estimating the associated risks and vulnerabilities for specific regions or for planning CCA measures.

Particularly as science advances, regularly new climate simulations become available. Improved global and regional climate models consider more physical processes or represent better physical processes of the earth system. They can simulate climate at a higher resolution and take into account a new range of possible developments of greenhouse gases (IPCC 2014).

Contact: [TUD](http://www.klimatickazmena.cz)

Figures: a) Available data and their application in different services, b) observed (1981-2010) and projected (2021-2040, 2021-2060, 2081-2100) mean annual temperature in the Czech Republic for different global climate models and RCP2.6 scenario. Data: www.klimatickazmena.cz

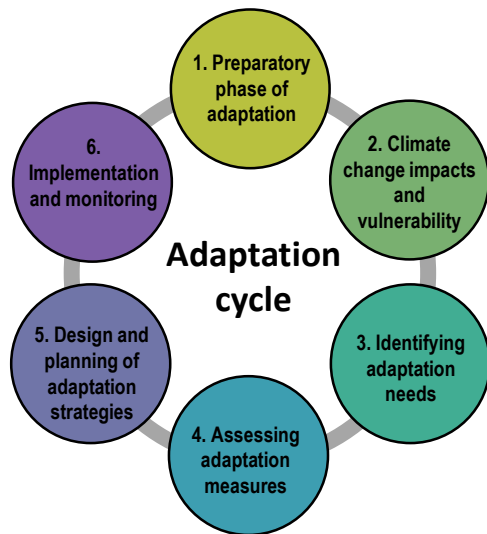


Supporting Tools and Instructions

Risk and Vulnerability Assessment

The estimation of risks is a requirement for acting and implementation of effective adaptation and strategies for disaster and risk management. Vulnerability reduction is the main scope of these strategies. Typically the assessment contains of three parts:

- Analysing information on current and future climate conditions
- Assessment of potential impacts on potentially vulnerable sectors
- Analysis of other factors and trends (ecosystem related, physical, technical, or socio-economic) influencing the climate risks in the respective sectors.



Adaptation cycle (Urban Adapt, 2015)
see also EU [Climate-ADAPT](#)

Contact: [TUD](#)

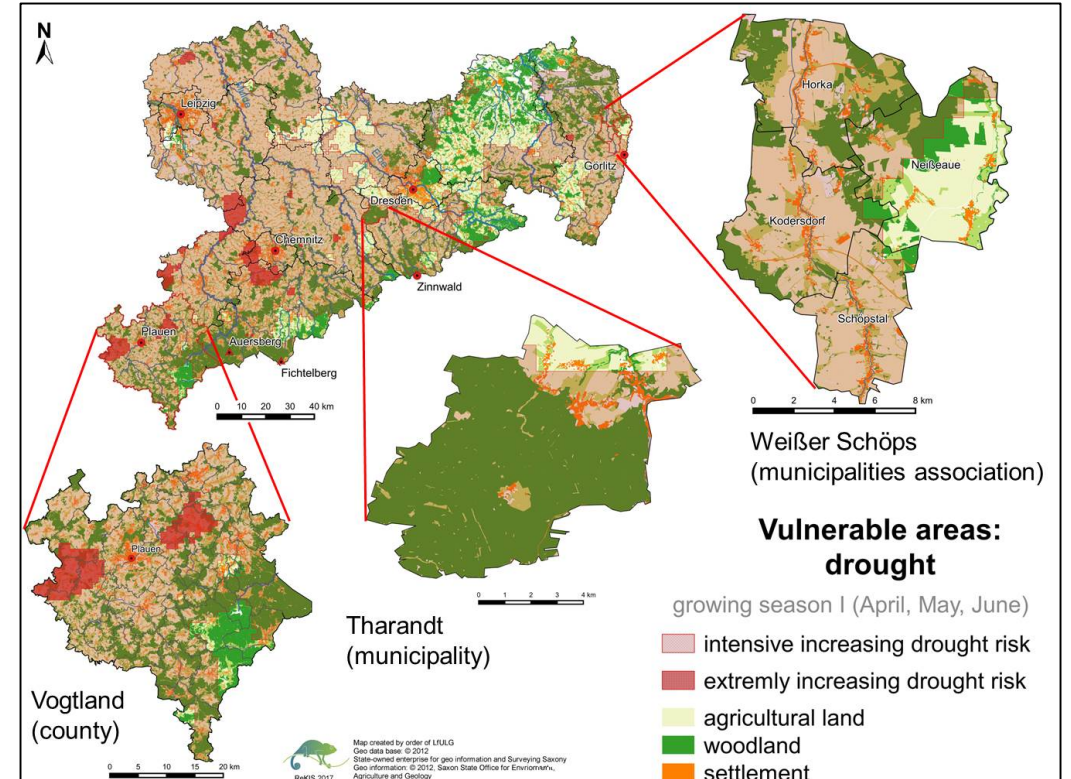


Figure: Areas vulnerable to drought in growing season (April-June) in Saxony, Germany

Supporting Tools and Instructions

Regional Climate Information System (ReKIS)

Within the [Regional Climate Information System \(ReKIS\)](#) the domain ReKIS-Kommunal was set up. Administration and development: Technische Universität Dresden (TUD) and Saxon State Office for Environment, Agriculture and Geology (LfULG).

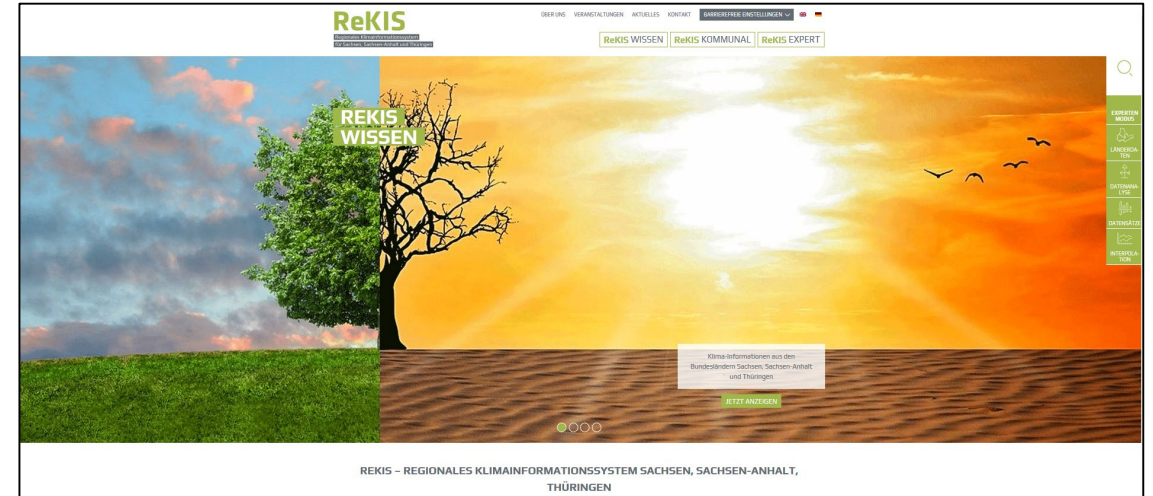
ReKIS is an interactive tool to provide, document, assess and interpret climate data for the German Federal States Saxony, Saxony-Anhalt and Thuringia. It offers:

- (Interactive) maps and graphics for climate-related themes
- Interpolation-tool RaKliDa
- Toolbox for individual analyses of climate data
- A download of observed and projected climate data

ReKIS-Kommunal provides information concerning:

- Challenges (heat, heavy rain, drought)
- Field of actions (health, civil engineering)
- Assistance (funding opportunities, glossary, etc.)

Contact: [TUD](#)



Supporting Tools and Instructions

Contest on Pilot Measures

To promote climate change resilient urban and landscape planning in municipalities via implementation of adaptation measures, state agencies could provide some seed money through the organisation of a contest. In the course of this contest, municipalities can apply for money to implement measures of which the best ideas will be funded. Such a contest offers the municipalities:

- Support for climate change adaptation and mitigation
- Relief in terms of personnel and finances in the planning phase
- Implementation of climate change requirements into planning
- Expert guidance and support specially tailored to local problems
- Planning of concrete engineering measures
- Support in finding funding opportunities

Example in Saxony, Germany: The municipalities were contacted directly and made aware of the contest. The best and most representative ideas were chosen by a jury. The winners received non-investment support, mainly used for a professional planning office that plans the measures.

Contact: [LfULG](#)

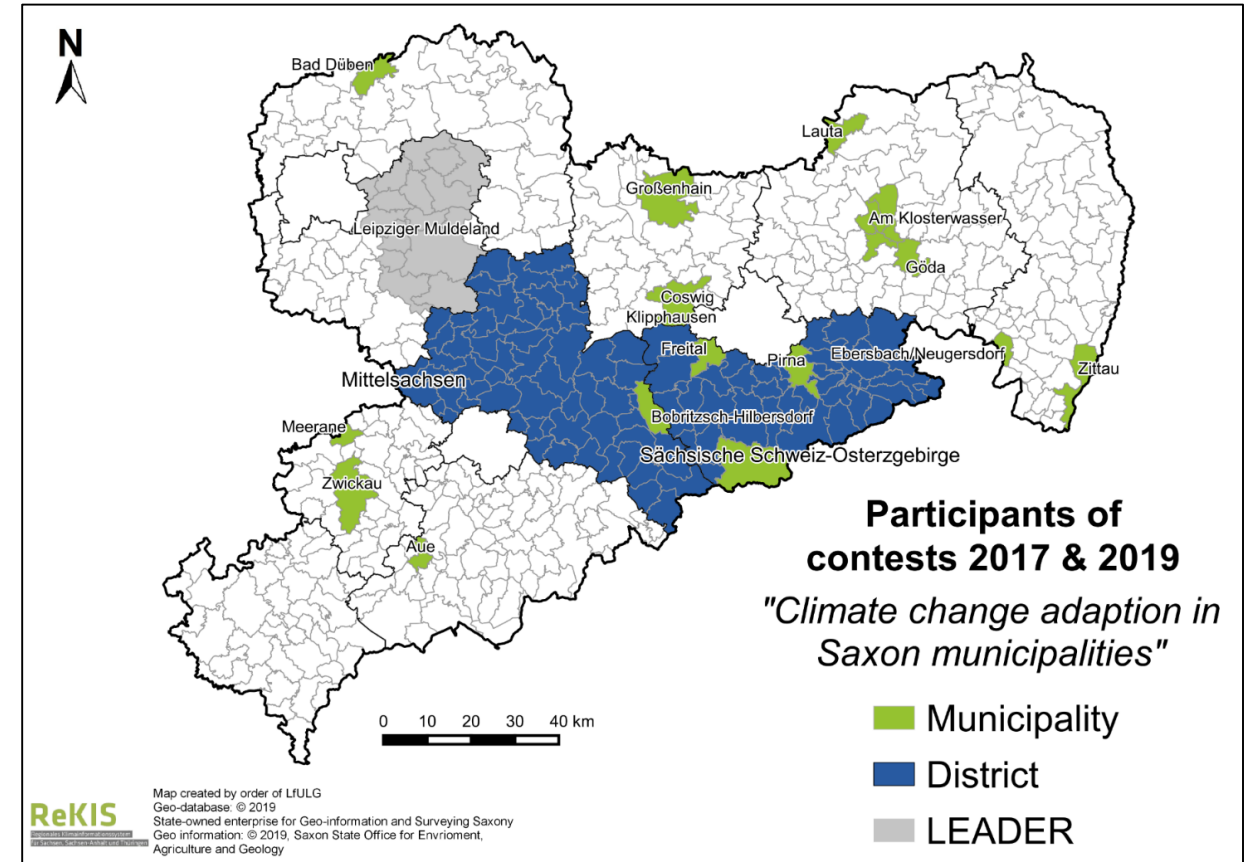


Figure: A map of Saxon municipalities participating in the contest on pilot measures in 2017 and 2019

Supporting Tools and Instructions

Contest on Pilot Measures

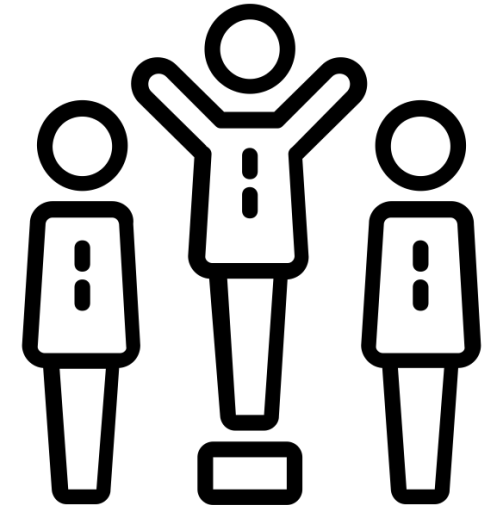
Two contests in 2016 and 2019 were undertaken as a part of the project

Starting Conditions:

- Per project idea: ø 30,000 EUR for a climate change adaptation measure
- Possible participants: cities, municipalities, intercommunal associations and municipal enterprises (max. population: 100,000), administration union and districts
- Feasible support for every contest with a duration of 1.5 years planning: 5 - 6 winners

Procedure: Integration into current projects of municipalities

The measure of the effectiveness of the contest: Through the contest and the number of participating municipalities, 30% of the population and around 30% of the area in Saxony could be reached in only 4 years.



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Transfer of LIFE LOCAL ADAPT
Products and Services

**Part C – Integration, Guidance and
Communication**

Integration, Guidance and Communication

Content

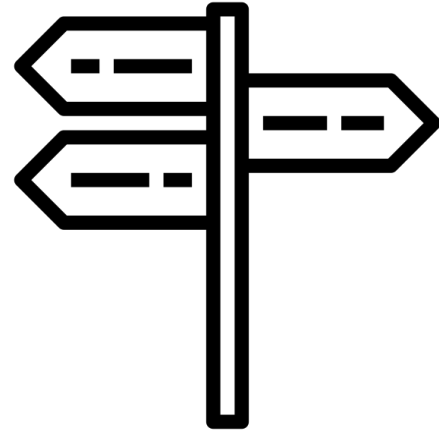
Best Practice:

➤ Climate Coach

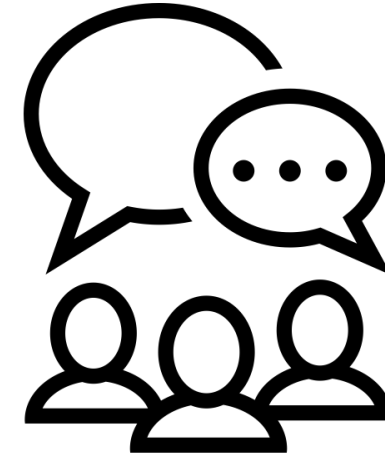
- Experiences
- Problems and Solutions

More Products and Services:

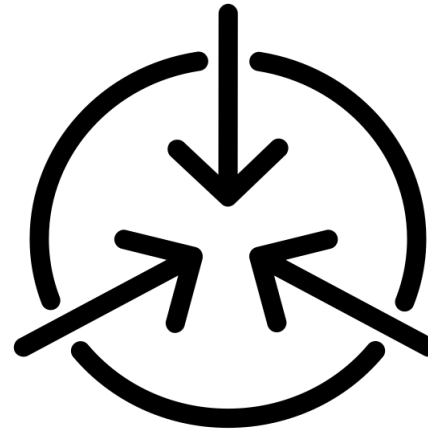
- Workshops



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Part C

**Integration, Guidance and
Communication**

Best Practice: Climate Coach

Integration, Guidance and Communication

Best Practice: Climate Coach

Climate Coaches are responsible for the climatic advice of the municipalities in the respective regions. They supply information about local climate impacts, adaptation measures and suitable funding programs. Furthermore, they organize meetings, conferences and workshops for an extensive exchange and knowledge transfer between experts and communities. Climate coaches have a specially designed know-how about climate risks and climate change adaptation (CCA) (e.g. fact sheets, subsidized consulting services, reviews, etc.)

Climate coaches in general pursue the following goals:

- Improving the data and information basis on climate change impacts
- Enhancing the knowledge of municipalities
- Integrating CCA into the administrative practice of local authorities
- Supporting implementation of specific CCA measures in the respective municipalities

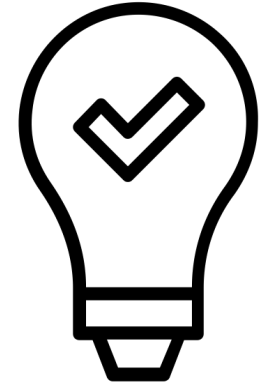
Contact: [LfULG](#)



Integration, Guidance and Communication

Best Practice: Climate Coach

- **What kinds of problems can occur during the transfer?**
 - The transfer of products and services must take into account the municipality's current knowledge of CCA, degree of adaptation, vulnerabilities and risks, planned investments and land use/land cover change. *Solution:* Intensive communication, e.g. with stakeholders from best practice examples
 - Lack of appropriate communication skills. *Solution:* Improving the knowledge base of stakeholders, further training on communication and simplification of the language



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Integration, Guidance and Communication

Best Practice: Climate Coach

Items related to the implementation and tasks of a climate coach in Saxony:

- The conception of a climate competence centre at LfULG
- Responsibility for data analysis and modelling
- Local coaches at branch office, district or energy agency
- Supporting municipalities during the adaption process
- Funding opportunities and support of application process
- Training by a competence centre

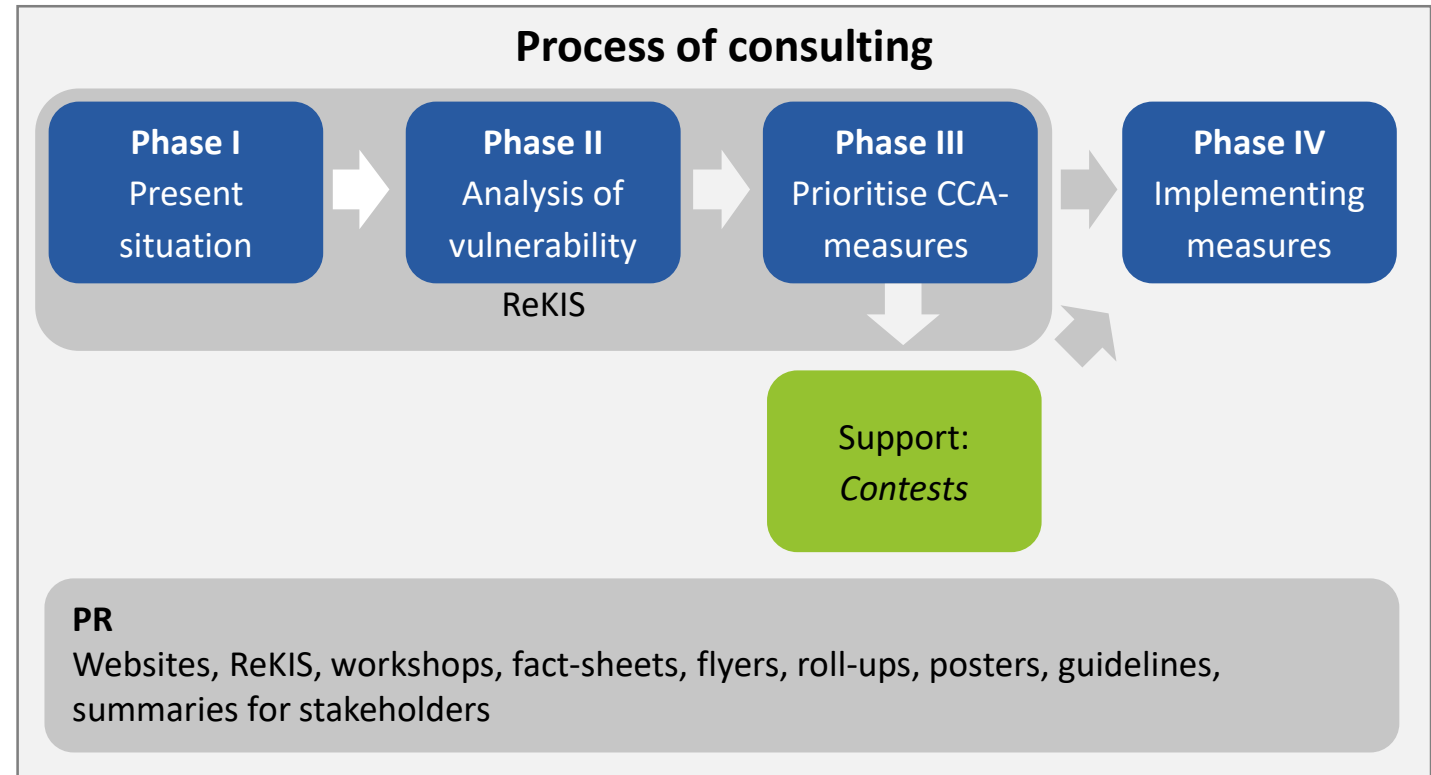


Figure: Scheme of the consulting process

Part C
**Integration, Guidance and
Communication**

More Products and Services

Integration, Guidance and Communication

Workshops

Workshops are an important tool to get in touch with municipalities and to address climate change adaptation measures. They are a good opportunity to raise awareness from a bottom-up approach.

How to organize a workshop in terms of climate change adaptation?

- **Involve Stakeholders:** get in contact with relevant stakeholders in the municipality, create a reference to the topic of climate change adaptation, address emotions, ask those involved whether they have already felt the effects of climate change in their personal life.
- **Present facts about climate change and its regional impacts:** give an overview of climate change adaptation, provide good practice examples, talk about possible funding opportunities, provide information about climate scenarios (if they are available in the respective municipality).

More detailed information on how to create a workshop can be found in the [Community Tool Box](#).

Contact: Provincial Government of Styria



Transfer of LIFE LOCAL ADAPT
Products and Services

Supplemental Information

Guidance Document

References and Websites

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Guidance Document

Product and Services - Contact Details

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603 00 Brno, Czech Republic
Website: www.czechglobe.cz

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