

STEPS OF THE PREPARATION OF A VULNERABILITY ASSESSMENT

Step 0 – Data collection, assessment of existing data

There are freely accessible databases (after registration) and organisations managing data that can be used for a service fees, in all countries of Europe, that can provide municipalities with data on the impacts of climate change and on changes in the weather conditions and temperature. Such organisations are, in most cases, national meteorological services, national water management directorates/authorities, as well as environmental or climate organisations.

Such online databases and platforms should be accessed during the performance of vulnerability assessments, and municipalities should browse on their towns/villages or regions among relevant contents. These pages also store important and highly usable data besides the Municipality's own plans, drawings, maps and the data it has measured/collected. (If it wishes to develop a long term strategy on the basis of the data, it should involve an expert in the interpretation of meteorological and climate data.)

Assessment of existing data

If multi-year time series are available (on precipitation, number of days of heat waves etc.), they should, by all means, be examined. Check whether any damage have been recorded in the town or village as a consequence of extreme weather events, what sectors and areas were affected, what exactly happened, who, in what form and to what extent were involved. (The above information should be presented in a table and on a topographic map and/or orthophoto. Thereafter contemplate how you can prepare to face weather events causing damage, assuming that they will increase in frequency and intensity.)

Involvement of stakeholders (for details, see Chapter 4 of the Adaptation Guide)

It is important that in carrying out the assessment and in working out the adaptation recommendations, the municipality should involve the most important stakeholders (see the list below). In addition to the information available in databases the local community must also be involved.

If the analysis of the current situation in the town or village and the collection and assessment of information on the impacts experienced, are carried out by the municipality in cooperation with the stakeholders, the integration of local knowledge, experience and various points of view in the assessment may generate considerable added value, promoting a more well-founded decision making process and adding to the acceptability of the decisions later on.

The most important stakeholders:

Residents, the municipality council or the relevant members of its committee, the officer in charge of the operation of the town/village, farmers, forestry and game management undertakings, village extension officer, field watchman, chamber of agriculture, local civil society organisation, churches, anglers' association, health workers (GP, chemist), education institutions, social institutions, local businesses, universities in the region, water management association, water utility service provider, water management directorate, disaster management authority, national park directorate, public health body, other administrative bodies (sectors referred to in section 8) etc.

More details on the methods of involvement are presented in Chapter 4 “Continuous involvement and communication”. Regarding the VA we recommend the conduct of individual interviews, the technique that has proven to be the most effective so far.

The following is a description of the 11 steps of a VA.

The aid table prepared for VAs (filled out with examples) can be downloaded in full from the document library of the website of the LIFE-MICACC Project:

<https://vizmegtartomegoldasok.bm.hu/storage/dokumentumok/Steps%20of%20a%20vulnerability%20assessment%20%20AID%20TABLE.pdf>

Step 1 - Analysis of the current situation

A vulnerability assessment starts with an **analysis of the current situation**. This includes a brief description of the following:

- Number of households, its changes
- Number of residents, its changes
- Age structure of residents, its changes
- Local economy
- Length and condition of roads
- Length and condition of canals
- Land use (areas, types, livestock)
- Water bodies, water resources
- Land users, protected areas, protected species¹, areas managed by the state

Step 2 - Preliminary assessment and illustration of perceived impacts, by sector²

The person carrying out the VA selects 3-4 typical sectors in the entire administrative area (e.g. field crop production, food industry, health, tourism, infrastructure, water management etc.) and collects the locally experienced impacts (including incidents in which damage occurs) in the various sectors according to the typical domestic climate change parameters, if any.

To this end it is worth showing the typical places of occurrence of the various impacts in the map of the entire administrative area of the town or village (e.g. transport routes usually affected by flash floods or sudden precipitation events).

¹ Listing the protected areas and protected species is particularly important as regards the local natural values.

² This should be a quick preliminary assessment step, because the following steps will review and evaluate its elements in detail, relying on the knowledge of the stakeholders involved, and the available data.

Éghajlati paraméter változása	Mezőgazdaságra gyakorolt hatás	Egészségre gyakorolt hatás	Infrastruktúrára gyakorolt hatás	Élővilágra gyakorolt hatás
	1 Felszíni levegő átlaghőmérsékletének növekedése			
	2 Nyári napok számának növekedése (napi max. > 25 °C)			
	3 Fagyos napok számának csökkenése (napi min. < 0 °C)			
	4 Hőségnapok számának növekedése (napi maximum ≥ 30 °C)			

Step 3 – Collecting climate phenomena and risks

Collection and characterisation of the **climate phenomena and treats** depending on the severity of the risk stemming from the given threat/phenomenon, what changes may be expected in its intensity and frequency and whether there is any indicator adequately showing it.

Éghajlatból eredő jelenségek/veszélyek

Éghajlatból eredő veszély	Jelenlegi kockázat szintje	Várható változás az intenzitásban	Várható változás a gyakoriságban	Indikátor (például)
Szélsőséges hő	Magas/Közepes/Alacsony	Magas/Közepes/Alacsony	Magas/Közepes/Alacsony	gyakorisága, hossza, napok száma
Szélsőséges hideg				hideg napok száma, fagyos napok száma, hóval borított napok száma
Szélsőséges csapadék				várható változás a nagy csapadékokban, csapadékelosztás trendje,
Árvíz				Veszélyeztetettség, várható változás
Szárazság				Veszélyeztetettség, Várható változás
Belvizek				Veszélyeztetettség, várható változás
Viharok				villámcsapás, erős szél, nagy csapadék
Földcsuszamlás, sárlavina				
Érdősüzek				
Ezzéb				

Step 4 – Exposure

The next page of the table contains questions on **exposure**. Here, too, you need to think about how typical each phenomenon is in your municipality (e.g. flash floods of small watercourses).

The list is not, and cannot be, exhaustive. If there is an exposure indicator not listed here, please add it to the table.

Kitettségre vonatkozó kérdések

Kitettség	nem jellemző	inkább nem jellemző	inkább jellemző	nagyon jellemző	nem releváns
Az utóbbi években növekedett az összefüggő kánikulai napok hossza					
Az utóbbi években gyakoribbá váltak a kisvízfolyások árvizei					
Az utóbbi években gyakrabban jelentkezik belvíz.					
Az utóbbi években nagyobb felületet (új területeket is) érintett a belvíz.					
Az utóbbi években csökkent a megművelt mezőgazdasági terület					
Az utóbbi években többször nem bírta kezelni a csapadékvíz-elvezető csatorna a vizet					
Az utóbbi években az árvizek megrongálták az útburkolatokat.					
Az utóbbi években villámkárrok/viharkárok fordultak elő					
Az utóbbi években növekedett a téli havazás, a hó borítottság a településen.					
Az utóbbi években csökkent a téli havazás, hó borítottság a településen					
Az utóbbi években a tél esős volt					
Az utóbbi években a tél enyhe volt					

← / →

Step 5 – Sensitivity

The **sensitivity** of the settlement is also assessed by completing the following table.

The table summarises sensitivity. If the location of the sensitivity and the sensitive sector or group can be clearly identified, briefly describe it. Sensitivity not specific to your municipality should be deleted from the table. If there is a sensitivity other than those listed here, complete the table.

Érzékenységre vonatkozó kérdések

Érzékenység	nem jellemző	inkább nem jellemző	inkább jellemző	nagyon jellemző	nem releváns	Kör érintettjei csoport, ágazat?	HáI találhatók az érintettek?
Megváltozott a krónikus betegek aránya (több elhízott, cukorbeteg, mentális kórkép stb.)							
A nagy esők a település belterületén rendszeresen előntéseket okoznak							
A nagy esők rendszerint ugyanazonok a területeken okoznak előntéseket.							
A belvíz csak meghatározott területrészeket érint, ahol a települési életben fontos útvonalak húzódnak és/vagy fontos létesítmények találhatóak.							
A belvíz főként a kerteket borítja el.							
A belvíz borítottság általában 1 hét.							
A belvíz borítottság általában 1 hónap.							
A belvíz borítottság több hónapig is előfordul.							
A nagy esőkből következő előntésekkel érintett területeken zömében vízzáró, burkolt felületek vannak.							
A nagy esőkből következő előntésekkel érintett területeken a lakók gyűjtik és hasznosítják a tetővizet.							
A nagy esőkből következő előntésekkel érintett területeken van csatorna vagy árok.							

Step 6 – Evaluation of impacts

The table summarises the identified impacts (damages caused) that have already occurred in the municipality. The impacts are briefly assessed according to how typical they were, when they occurred, where they occurred, what damage occurred and who was affected. The impacts listed are only examples. They can be modified, deleted or extended as you wish. It is worth deleting impacts not identified in your municipality. Impacts that are not listed but occur in your area should be added to the table.

Here are some examples of **impacts**. It is worth thinking about the extent to which they are specific to the municipality. Try to **assess the impacts** according to how typical they are in your municipality, for example by using the following criteria (moderately typical – highly typical):

- During heat waves, the number of people requiring medical attention, the number of ambulance calls and deaths increased;
- Foodborne illnesses, poisonings (e.g. in the community) during hot summer periods;
- More patients with allergies;
- Inland flooding has made burials more difficult;
- Regular flooding in some areas of the municipality during periods of heavy rainfall;
- More frequent major storm damage to infrastructure;
- Etc.

Hatásokra vonatkozó kérdések

Hatások	nem jellemző	inkább nem jellemző	inkább jellemző	nagyon jellemző	Mikor? Milyen mértékű?
A hőhullámok alatt nőtt az orvoshoz fordulás, mentőhívások száma, halálozás					
Az UV sugárzás hatására több lett a leégés, bőrrákok száma					
A nyári meleg időszakokban ételfertőzések, mérgezések jelentkeztek (pl. közösségben)					
Az allergiás tünetek miatt nőtt az orvoshoz fordulás; illetve a nemvényköteles allergia ellenes gyógyszerek forgalma					
Több lett az allergiás beteg					
Előfordultak eddig nem tapasztalt betegségek (pl. rovarok, rágcsálók által terjesztett betegségek)					
Több lett-e a Lyme kóros betegek száma					
Előfordult kullancs által terjesztett agyvelőgyulladás					
Előfordult Nyugat-Nilusi láz					
Árvíz miatt volt emberi sérülés					
Árvíz miatt volt anyagi veszteség, esetleg kitelepítés					
Villámárvíz miatt volt kár az infrastruktúrában (pl. hidak).					
Viharkárok emberi sérüléseket okoztak.					

Assessment of impacts and their likelihood

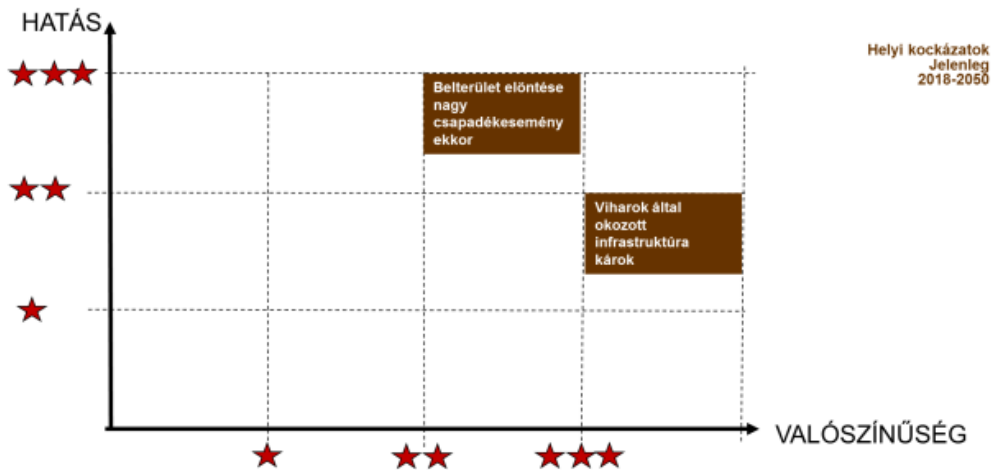
At this point, it can be a useful exercise to compare these impacts with each other and assess their magnitude and likelihood. For example, the impact of inland flooding may be very large, but less likely to occur frequently in the future.

For example, draw a diagram to rank risks in terms of impact and probability for the present, as well as the near and distant future. This will identify the most likely significant impacts on which to base the local strategy.

Let's rank some impacts, for example:

- inland flooding during major rainfall events;
- damage to infrastructure caused by storms;
- etc.

A hatások és azok előfordulási valószínűségének értékelése

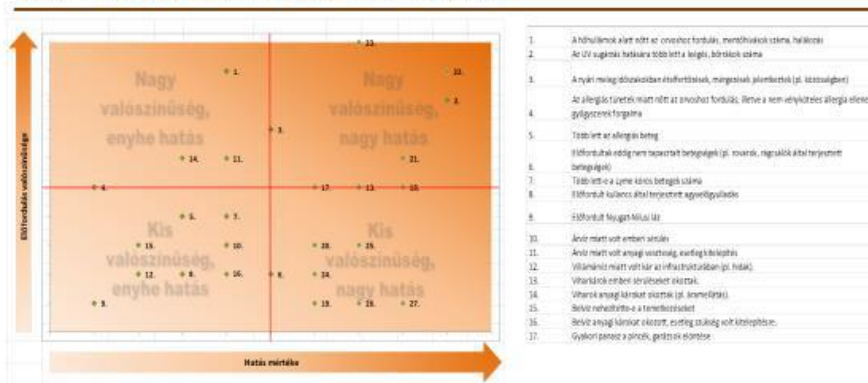


Step 7 – Risks

The previous exercise is supported by the diagram on the next page of the table. The figure itself does not need to be edited, only the table next to it has to be filled in with the probability of each impact occurring and the severity of the impact in the locality, i.e. the magnitude of the **risk**.

Based on the knowledge of the identified impacts, we estimate which impacts are likely to have a greater magnitude and likelihood of occurrence in the future. The numbers entered are examples and can be substituted. The description of the identified impacts can be modified; just change the text within the cell. The number of effects can be expanded by inserting new rows at the end of the list. By specifying the identified effects and filling in the corresponding probability and impact values, the identifiers will automatically appear in the matrix in the appropriate place.

Hatások értékelése > kockázatok



Step 8 – Sectors

In any case, examine the climate-related damage events experienced in your municipality in the following **sectors** (of course, only the sectors relevant for your municipality are examined): health, social services, agriculture, forestry, industry, energy supply (electricity, gas, fuel, district heating), production and networks, drinking water supply, waste water drainage and treatment, storm water management, waste management, residential buildings, public buildings, service buildings, infrastructure (roads, railways, sewers, telecommunications), green spaces, biodiversity, tourism.

In the table, the impacts in each sector are assessed according to the climate phenomenon that caused them. Of course, only those cells should be filled in where impacts are relevant, i.e. there is an identifiable climate-induced impact in the sector.

In the cells of the table, enter the characteristic effect in a short description.

Step 9 – Evaluation of impacts and sectors

Moving on, we summarise the data from the previous two tables.

We assess which sectors are the most important in the life of the municipality, and where, how and to what extent they are affected by the identified impacts. Possible adaptation measures are also provided.

The table describes the impacts identified in the sectors most affected by climate change.

The probability of occurrence and the magnitude of the impact are selected from the drop-down menu. We then specify the indicator against which the impact can be measured.

Briefly describe the area in which the impact has been identified, which is also marked on a topographic map or orthophoto.

Briefly describe who was affected (harmed) by the impact.

Briefly describe what adaptation measures are proposed to avoid damage.

Step 10 – Adaptability

Moving further down the table, we come to information on **adaptability**. For these, we also select how typical they are in the municipality. This will help to reveal the existing adaptive capacity.

Some questions or statements are included in the table that help to reveal the existing adaptive capacity.

The first step is to assess whether the question or statement is meaningful and specific to your municipality, then describe the sectors or groups to which they apply and briefly state how they reduce vulnerability.

Alkalmazkodóképesség

Alkalmazkodó képesség	nem jellemző	inkább nem jellemző	inkább jellemző	nagyon jellemző	Részlet
A település rendelkezik-e hőségtervvel					
Az óvodák/iskolák rendelkeznek-e hőségtervvel					
Az óvodák/iskolák rendelkeznek hőségtervvel és alkalmazzák-e					
Az orvosi rendelők rendelkeznek-e hőségtervvel és alkalmazzák-e					
Az orvosi rendelők rendelkeznek-e hőségtervvel					
Az időseket/rászorulókat gondozó intézmények rendelkeznek-e hőségtervvel					
Az időseket/rászorulókat gondozó intézmények rendelkeznek-e hőségtervvel és alkalmazzák-e					
Hőség/UV riasztás során tájékoztatják-e a lakosságot (köztéren, közintézményekben plakát)					
Vannak-e árnyékolók a közterületeken (buszmegállók?)					Hány %? Darab?
Van-e speciális intézkedés? (vizosztás, közkutak működtetése)					
Van-e intézkedés a strandokon (UV szint közzététele, csónak kölcsönzés korlátozása, meghosszabbított nyitvatartás)					
Van-e helyi munkarendre vonatkozó szabályozás (munkakezdés, szieszta)					

Some example questions to assess adaptability:

- Do kindergartens/schools have a heat plan and do they apply it? If so, briefly describe it, if not, decide whether it could be implemented in the future.
- Are there shelters in public areas (bus stops?) If so, describe briefly, if not, decide whether they could be implemented in the future.
- Is there an alarm/emergency call system for the elderly, people living on farms? If so, describe briefly, if not, please decide whether it could be implemented in the future.
- Are there NGOs involved in education and in the management of alerts? If so, describe briefly, if not, decide whether it could be implemented in the future.
- Is there an afforestation plan for the municipality (tree-lined areas, protective forest strips, planting of allergen-poor trees)? If yes, describe briefly, if not, decide whether it can be implemented in the future.
- Is there a record of the sewerage network managed by the company and its operation? If yes, describe briefly, if not, decide whether it could be implemented in the future.
- In the case of regularly flooded areas (e.g. cemeteries, low-lying housing estates), can runoff be modified by storage (e.g. nearby wetlands, material catchments) or infiltration? If yes, describe briefly, if not, decide whether it could be implemented in the future.

Step 11 – Formulating adaptation measures

This brings us to the part where **adaptation measures and interventions** can be formulated. It is important to involve key stakeholders in defining these. There are many possible measures we can apply to solve a single problem. The real challenge is to find one that does not cause problems elsewhere. Each measure should be summarised according to the columns in the table, i.e. which sector it is specific to (e.g. roof run-off collection and storage for water management), who will be responsible for it, how it will be financed, who are the key stakeholders (e.g. public institutions) and who are the key supporters of the proposed measure.

The table below assesses possible adaptation measures. The measures described in the table are only examples. Describe the measure, then describe which sectors (e.g. health, agriculture, etc.) or groups (e.g. elderly, children, public workers, etc.) it helps in their adaptation. Briefly describe the location of the intervention and illustrate this with a topographical map or orthophoto. Briefly assess the feasibility of the proposed intervention (e.g. is it feasible, because the site is accessible, its ownership issues are clarified, or not feasible because the owner's consent cannot be obtained). Then briefly describe whether the measure can be financed, e.g. through an operational programme or own budget, or does not require significant funding. Then estimate the degree of local support (e.g. the population would certainly support it, farmers, entrepreneurs would certainly not). If you already have a suggestion as to which actors would support it, list the potential supporters in the cells of the last column.

Alkalmazkodási intézkedési javaslatok

Lehetséges alkalmazkodási intézkedések	Ágazat	Leírás	Felelős	Finanszírozás	Bevonandók/érintettek köre	Potenciális támogatók
Inváziós növények visszaszorítása						
Tetőcsapadék-gyűjtés és tározás Önkormányzati csatornákból vízvisszatartás						
Idősek felvilágosítása hőhullámok előtt						
Zöld terület előírása (telken belül) Helyi adóból klímaalap > erdősávok telepítése						
Felső vízgyűjtőn erdősítés						
Helyi egyesület alapítása Nemzetközi partner keresés, pályázat						
Szárazságtűrő növénykultúra bevezetése (piackutatás)						