

D.T1.3.2: TRAINING MATERIAL FOR MUNICIPALITIES ON URBAN CIRCULAR WATER MANAGEMENT AND GOVERNANCE

Version 1
12 2019





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Introduction

The present document has been produced by Poliedra in the context of Interreg Central Europe project CWC, as Deliverable D.T1.3.2, Training material for municipalities on urban circular water management and governance. It contains modular training material (TM) introducing the policy framework & smart governance measures applicable in urban circular water management. The Deliverable is divided in three main chapters:

1. WATER GOVERNANCE IN CITIES
2. CWC GOALS
3. SMART WATER GOVERNANCE: CATEGORIES OF INTERVENTION

An Appendix presenting some of the most used Participatory techniques closes the Deliverable.



1. WATER GOVERNANCE IN CITIES

People's well-being and economic activities unquestionably hinge upon a critical component: water. In cities, water represents both an opportunity to carry out economic and social functions, and a threat, when consequences of disastrous events hit local economies and ecosystems. Yet, whether water is a challenge or an opportunity for cities largely depends on how well and efficiently it is governed. Indeed, urban water governance is about “doing things right” when managing too much, too little and too polluted water in cities and their hinterlands and providing adequate services¹.

New socio-economic paradigms such as the circular economy are calling upon better use and re-use of natural resources, including water. The key question is how to accomplish these objectives? While technical solutions are well-known and available, they represent only part of the solution for cities to manage water in a sustainable, integrated and inclusive way, at an acceptable cost, and in a reasonable timeframe. Therefore, beyond determining “what-to-do”, it is important to know “who does what”, “at which level of government” and “how”. In other words, it is essential to implement governance frameworks that can help cities to adapt to changing circumstances, while maintaining their central role in local, national and global contexts (Romano & Akhmouch, 2019).

Monitoring and evaluation are among the key elements for better design and implementation of urban water governance.

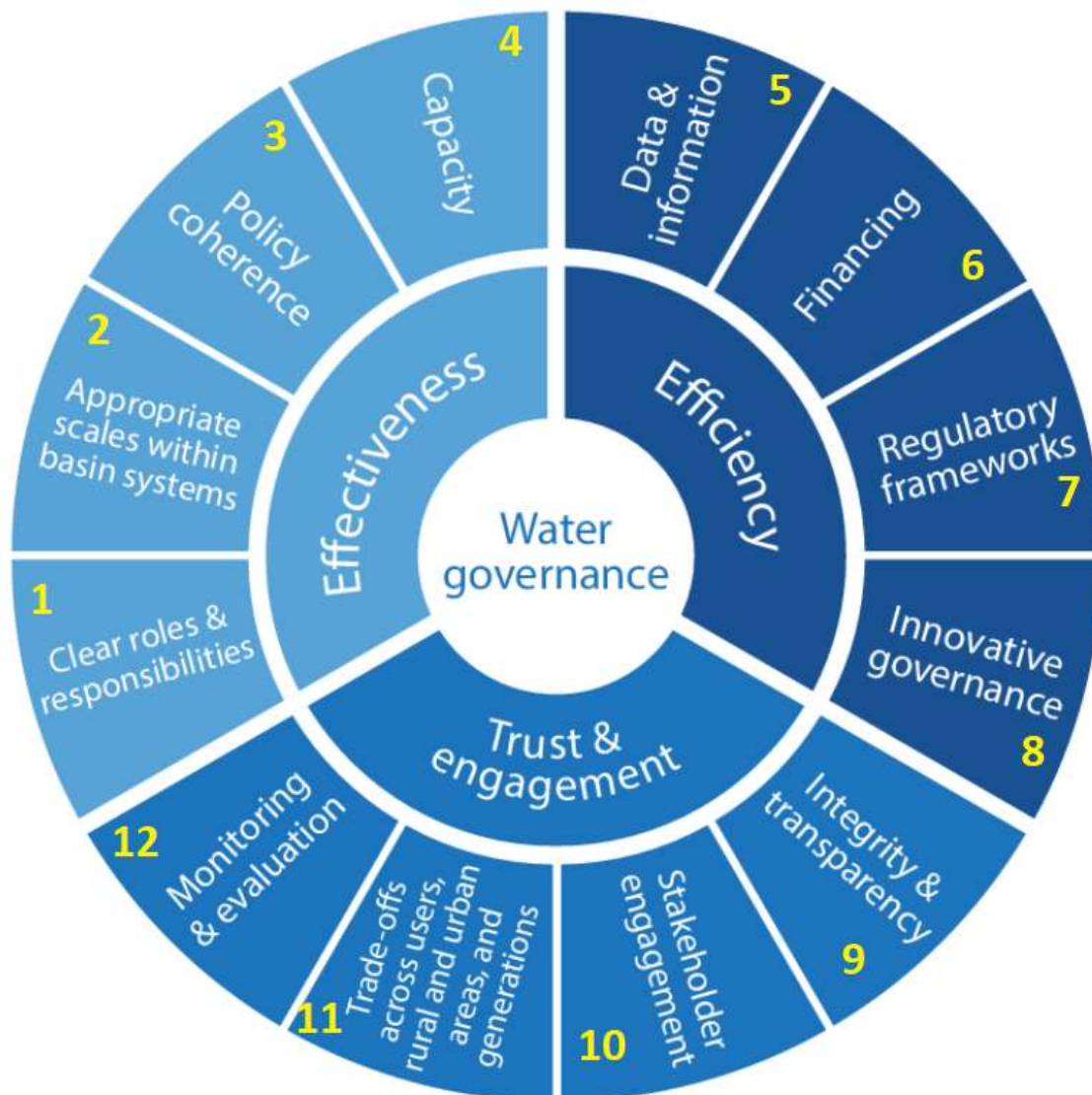
According to the OECD (Organisation for Economic Co-operation and Development) “Water governance is the set of rules, practices, and processes (formal and informal) through which decisions for the management of water resources and services are taken and implemented, stakeholders articulate their interest and decision-makers are held accountable”². As such, governance is not synonymous with government, and is distinct from water management, which refers to operational activities, for instance delivery and recycling.

As a matter of fact, cities are unable to address the complexity of water challenges on their own, but need to work with lower and higher levels of governments and put in place meaningful mechanisms for participation. “System thinking” can reduce institutional fragmentation, while improving co-ordination and coherence across different policies. To provide better understanding and policy guidance on water governance to public, private and non-profit actors, the OECD, together with member states and water experts gathered in the OECD Water Governance Initiative, developed 12 Principles on Water Governance. The Principles are structured around three pillars: effectiveness, efficiency, and trust and engagement. Governance should contribute to the definition and implementation of policy goals (effectiveness), at the lowest possible cost to society (efficiency), while ensuring inclusiveness of stakeholders (trust and engagement).

The OECD's 12 Principles reported below refer to the water policy cycle:

¹ Romano, O., & Akhmouch, A. (2019). Water Governance in Cities: Current Trends and Future Challenges. *Water2019*.

² <https://www.oecd.org/cfe/regional-policy/OECD-Programme-water-governance.pdf>



Enhancing the effectiveness of water governance

1. Clearly allocate and distinguish roles and responsibilities for water policymaking, policy implementation, operational management and regulation, and foster co-ordination across these responsible authorities.
2. Manage water at the appropriate scale(s) within integrated basin governance systems to reflect local conditions, and foster co-ordination between the different scales.
3. Encourage policy coherence through effective cross-sectoral co-ordination, especially between policies for water and the environment, health, energy, agriculture, industry, spatial planning and land use.
4. Adapt the level of capacity of responsible authorities to the complexity of water challenges to be met, and to the set of competencies required to carry out their duties.



Enhancing the efficiency of water governance
5. Produce, update, and share timely, consistent, comparable and policy-relevant water and water-related data and information, and use it to guide, assess and improve water policy.
6. Ensure that governance arrangements help mobilise water finance and allocate financial resources in an efficient, transparent and timely manner.
7. Ensure that sound water management regulatory frameworks are effectively implemented and enforced in pursuit of the public interest.
8. Promote the adoption and implementation of innovative water governance practices across responsible authorities, levels of government and relevant stakeholders.

Enhancing trust and engagement in water governance
9. Mainstream integrity and transparency practices across water policies, water institutions and water governance frameworks for greater accountability and trust in decision-making.
10. Promote stakeholder engagement for informed and outcome-oriented contributions to water policy design and implementation.
11. Encourage water governance frameworks that help manage trade-offs across water users, rural and urban areas, and generations.
12. Promote regular monitoring and evaluation of water policy and governance where appropriate, share the results with the public and make adjustments when needed.

Main characteristics of governance for a circular water management process are:

- Integrated Water management (holistic approach)
- Active involvement of the relevant stakeholders
- Transparent definition of roles
- Availability of data and tools for active participation
- Stakeholders are enabled to play their roles

Governance and participation

Stakeholder participation is a key success factor for the development and efficient operation of water reuse schemes. In order to build trust and get support, developers and local authorities therefore need to initiate stakeholder awareness raising actions, consultation and collaboration activities during the development of new water reuse schemes. In most cases, the development of water reuse projects is thus an opportunity to enhance good governance practices and public participation.

A key factor in successful stakeholder management is tailoring the content, scope and focus of participation to the interests and priorities of the stakeholders. It is important to understand what participation is seeking to achieve and how stakeholders can be involved in that process. In the Appendix, examples of techniques that can support the co-creation process at its different stages are reported.



2. CWC GOALS

The general objectives of the CWC project to achieve circular water management can be classified as:

- Recycle and reuse wastewater
- Increase efficiency in water use and distribution
- Guarantee good quality of water bodies
- Retain water as long as possible on site
- Promote multiple water use and water sustainability
- Preserve flow in water bodies



These goals are achieved through for four areas of intervention:

- Water Governance
- Water efficiency & water loss reduction
- Rain water management
- Grey water recycling

In this document the focus is on Water Governance and on the different way in which the CWC goals are achieved by adopting governance measures. In fact, water governance can be considered as cross-cutting the other areas



3. SMART WATER GOVERNANCE: CATEGORIES OF INTERVENTION

The water governance categories of intervention considered are extrapolated and clustered from deliverable D.T1.2.3. “*COLLECTION OF SMART GOVERNANCE SOLUTIONS APPLICABLE IN URBAN CIRCULAR WATER MANAGEMENT*“, in which examples of policy and governance coming from different parts of the World (as Cyprus, United States, India, etc.) are reported. The categories of intervention identified are:

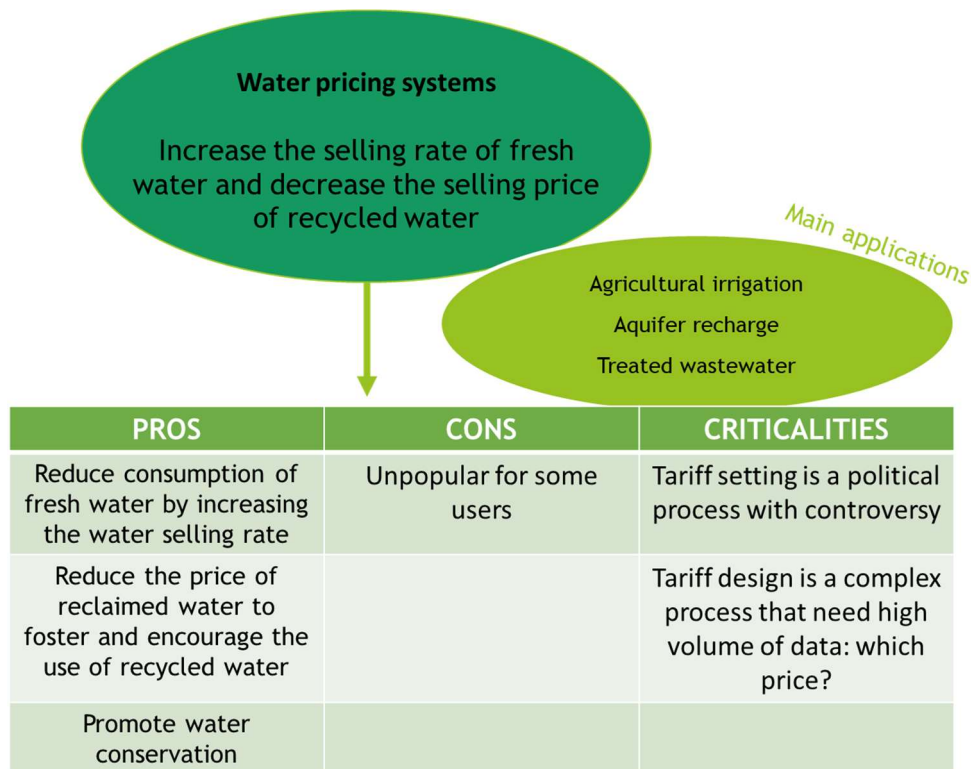
1. Water pricing systems
2. Water conservation programs
3. Minimum quality level standards
4. Incentives e Financial support (for recycled water project & construction of harvesting systems)
5. Education programmes
6. Rainwater harvesting and reuse legislation
7. Greywater reuse legislation

The interventions can act on different levels of the water circle, depending on the aim for which they are conceived; in addition they can be combined depending on the case studied and depending on the purpose. There is no general scheme to be applied to understand which measure to implement, it is necessary to study case by case the situation and the problems.

In the following, the different categories of intervention are analysed with the help of examples.



Water pricing system



The water pricing system governance can act in two different ways, on one side by increasing the water selling rate of fresh water in order to reduce the consumption of it and on the other side by reducing the water price of the reclaimed water with the aim to foster and encourage the use of recycled water.

For example reused water tariffs in Cyprus range from 33%-40% of freshwater rates; these ratios appear typical for the EU Mediterranean islands. The table below presents a comparison of the selling rates of abstracted freshwater and treated wastewater.

Cyprus:

Use	Tertiary Treated Effluent	Fresh not filtered water from government water works
	€/m ³	€/m ³
For Irrigation divisions for agricultural production	0.05	0.15
For Persons for agricultural production	0.07	0.17
For irrigation of hotels green areas and gardens	0.15	0.34
For pumping from an aquifer recharged by the treated effluent	0.08	n.a

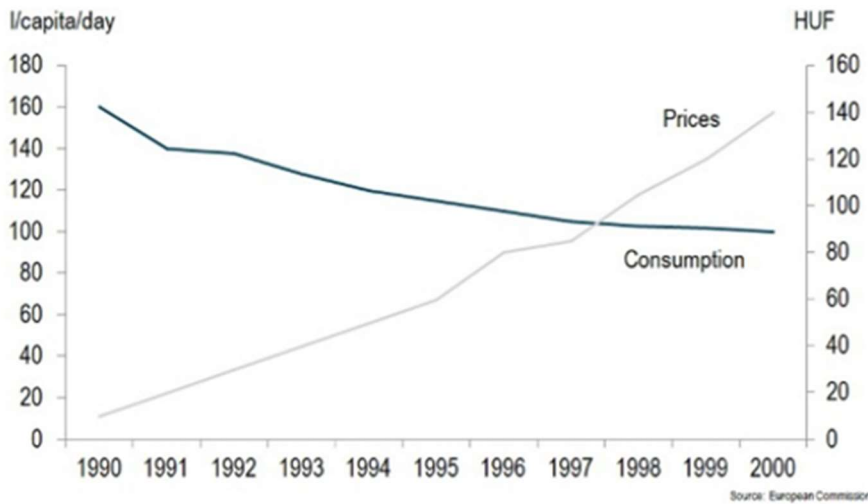
Another example from U.S. is the city of San Antonio in Texas where the potable water rate is \$0.098/100 gallons (0.4 m³) plus a Water Supply Fee (WSF) and Edwards Aquifer Authority (EAA) fee. In 2003, the WSF was \$0.094/0.4 m³ and the EAA fee was \$0.0086/0.4 m³, resulting in a total cost of \$0.20/0.4 m³,



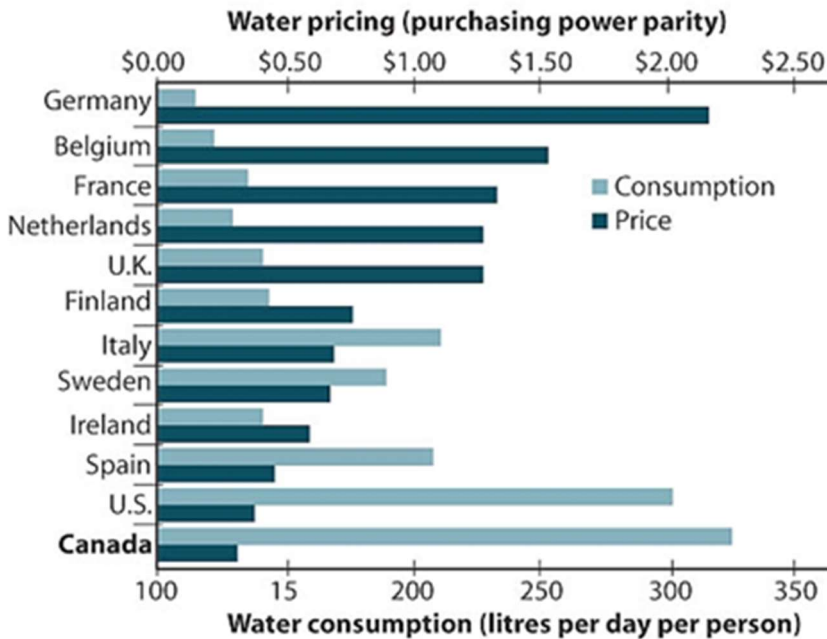
while the recycled water rate was \$0.098/0.4 m³, resulting in a cost savings of 51 percent over the potable water rate.

The effect of price on water consumption can be clearly seen also from the following graphs.

Water consumption and prices in Hungary [l/capita/day; Hungarian HUF]

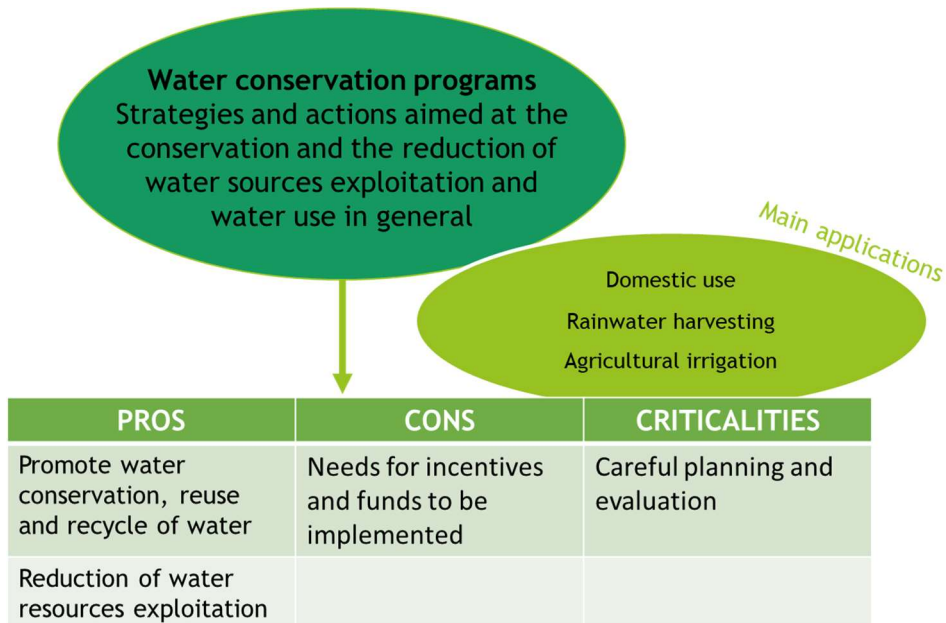


Water pricing versus water consumption





Water conservation programmes



Water Conservation programs are usually carried out by water utilities, and they require careful planning and subsequent evaluation to ensure that the programs continue to save water and are cost-effective investments for the water supplier. The most appropriate water conservation strategies and actions will vary between communities depending on local conditions and opportunities.

One example of water conservation strategy carry out by the city of Chicago is the **Chicago's Meter-Save program**, which installs residential water meters free of charge. This program is successful because people are seeing considerable savings with completely free installation and a seven-year guarantee that bills will be no higher than they would be without a meter. Non-metered customers pay a flat fee for water every six months. Metered customers pay only for the water they actually use. The program also offers indoor or outdoor water conservation kits as incentives for signing up.

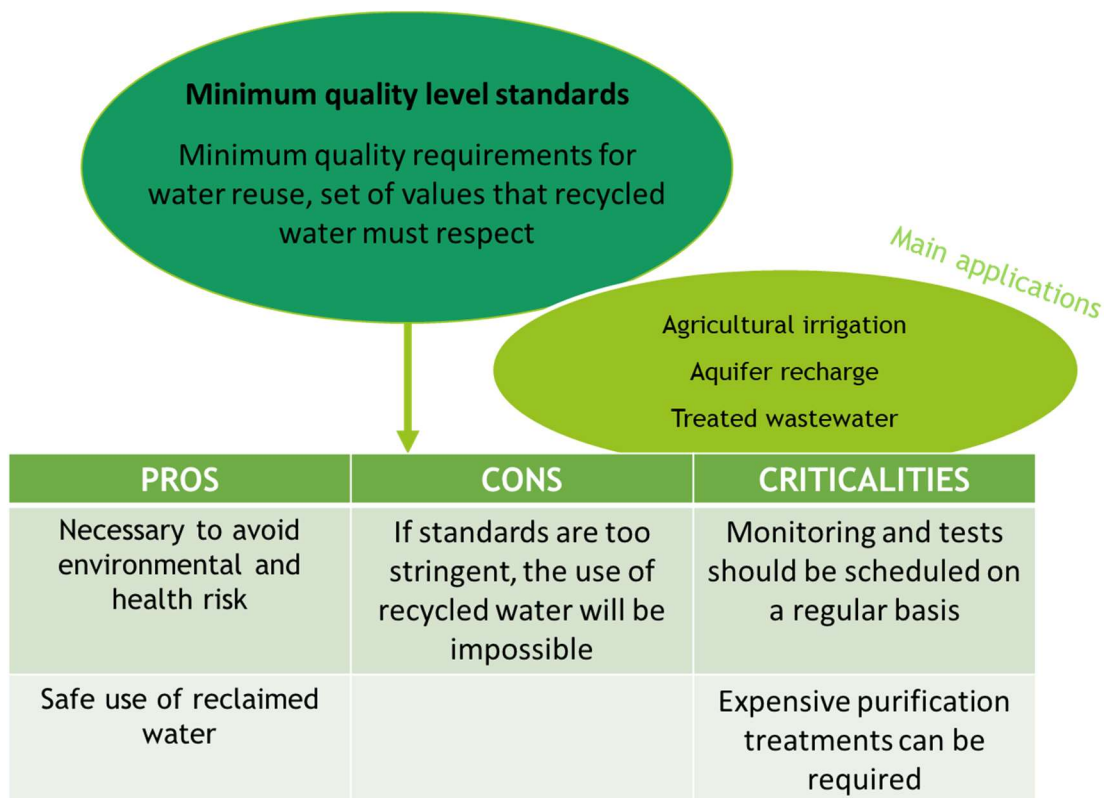
Chicago's voluntary Meter-Save program:



Other programs focus on public and citizen involvement in water reuse project with the final aim to preserve water resources and to promote water reuse.



Minimum quality level standards



The development of minimum quality requirements for water reuse is based on a risk management framework, which is recommended to tackle health and environmental risks and assure a safe use of reclaimed water. The minimum requirements defined should ensure an appropriate health and environmental protection and thus provide public confidence in reuse practices. Minimum quality requirements should include microbiological and physic-chemical parameters, associated limit values and monitoring frequencies should also be established, in addition preventive measures to be adopted are defined.

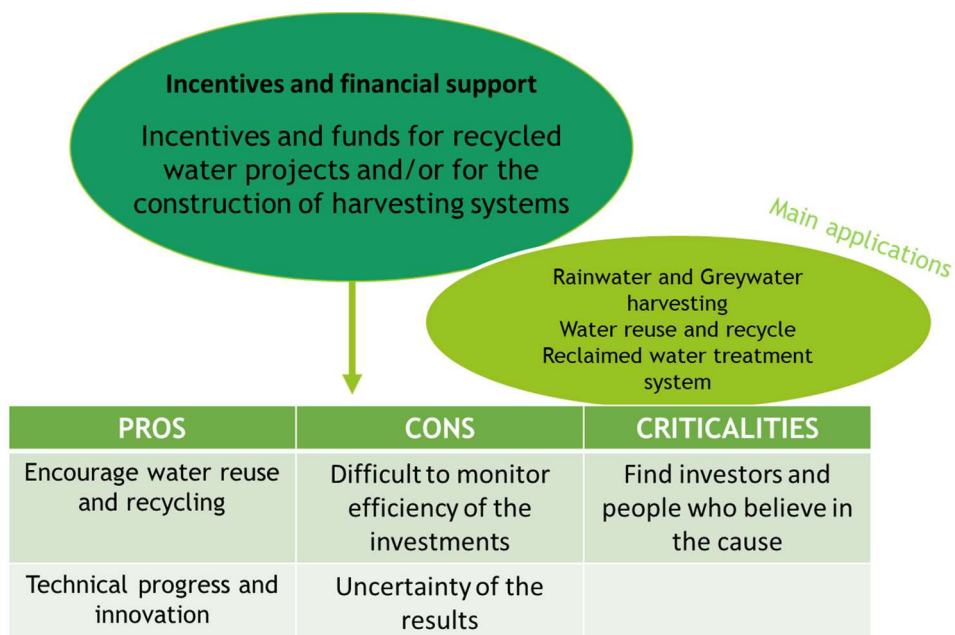
To our knowledge, in Europe, there are six member states in which minimum quality level standards for water reuse are set, they are Cyprus, France, Greece Italy, Portugal and Spain. In the figure below the differences in maximum limit values for selected parameters considered in national standards for water reuse are reported.



Parameters	Cyprus	France	Greece	Italy	Portugal	Spain
E coli (cfu/100ml)	5-10 ³	250-10 ⁵	5-200	10	-	0-10,000 ⁶⁹
Faecal coliforms	-	-	-	-	100-10 ⁴	-
TSS	10-30	15	2-35	10	60	5-35
Turbidity (NTU)	-	-	2-no limit	-	-	1-15
Biochemical oxygen demand (BOD 5) (mg/l)	10-70	-	10-25	20	-	-
Chemical oxygen demand (COD) (mg-l)	70	60	-	100	-	-
Total nitrogen (mg/l)	15	-	30	15	-	10

Source: Reproduced from JRC, 2014. '-' indicates that there is no value set for the parameter in the national legislation

Incentives and Financial support





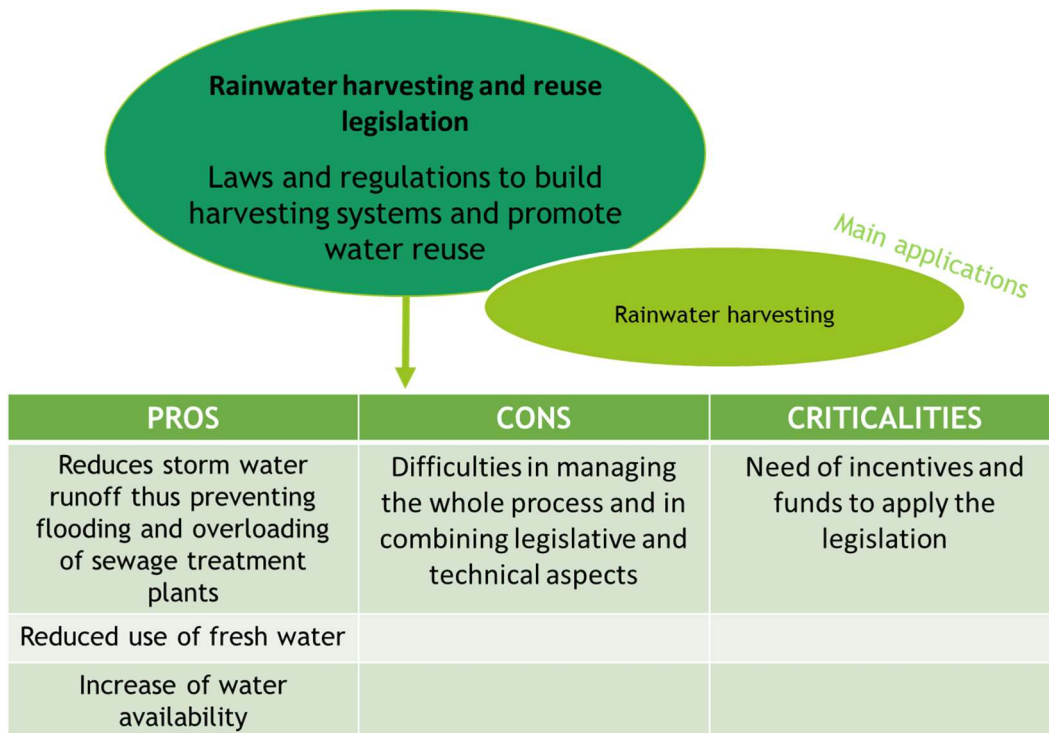
Education Programmes



One example is in the U.S., West Basin Municipal Water District has an extensive ongoing public outreach program. A **proactive children’s education program**, called the Planet Protector Explorations, was developed to heighten public awareness in the entire community. The **outreach efforts work in tandem with construction, recycled water marketing, conservation, and school education** to inform the public. WBMWD’s Speakers Bureau targets local cities and civic and environmental groups that are affected by WBMWD’s recycling project. These programs have been instrumental in **capturing the support and enthusiasm of the residents, educators, students, and businesses and industries.**



Rainwater harvesting and reuse legislation

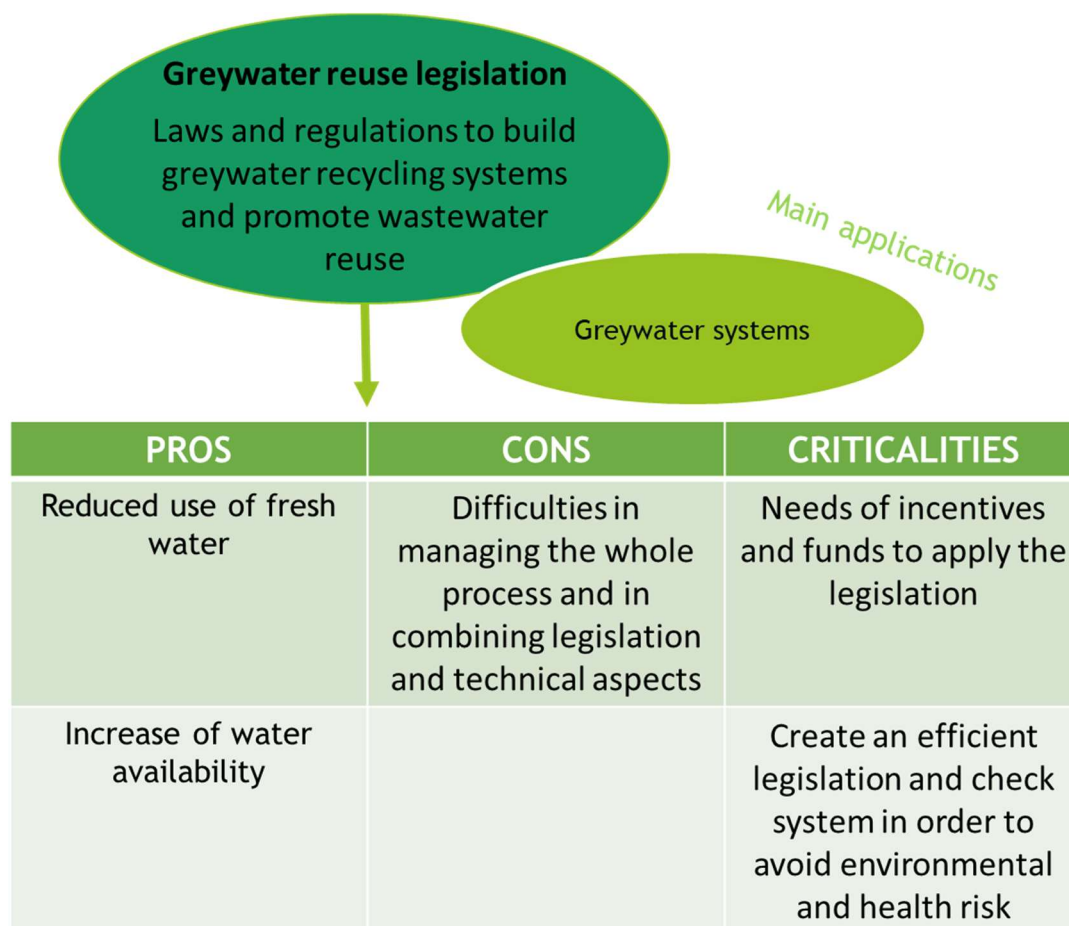


In India rainwater harvesting and reuse has been **widely adopted**: many cities adopt **laws and policies on rainwater harvesting**; in addition **financial assistance** is given to people who decide to build a rainwater harvesting system. For example, in New Delhi a financial support is given to a maximum of 50% of total cost of the Rain Water Harvesting structure or 100000 rupees (1260 euro), whichever is less.

In addition **in most of the Indian cities rainwater harvesting has been made mandatory**.



Greywater reuse legislation



Rainwater harvesting legislation has been advancing steadily across the U.S. for a number of years, starting with the landmark document adopted by the State of Texas in 2001, “**The Texas Manual on Rainwater Harvesting.**”

While not as common as legislation related to rainwater harvesting systems, several states across the U.S. are in the process of enacting or have already enacted **legislation that enables greywater reuse**, including Washington, Massachusetts, New York, South Dakota, Montana, Texas, Nevada, Arizona, California, Utah, New Mexico, Georgia, Idaho, Wisconsin, and Florida.

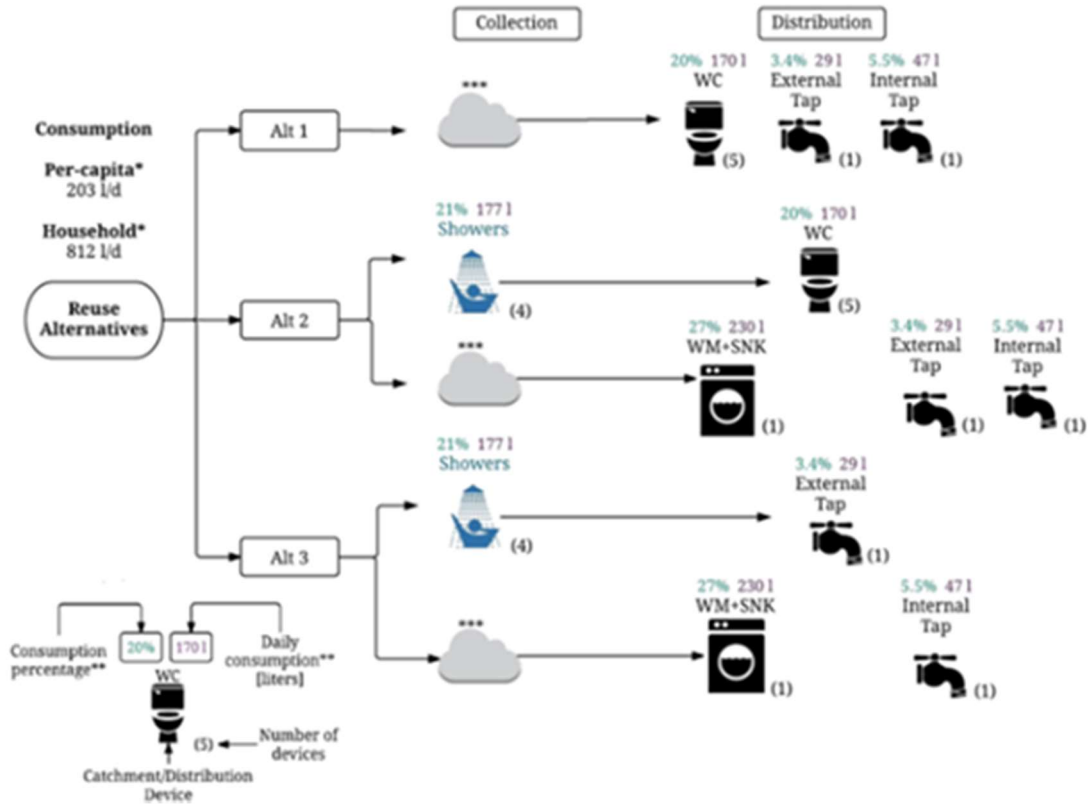
Generally speaking, **greywater reuse is more broadly permitted for subsurface irrigation than it is for flushing toilets.**

When greywater is reused for irrigation, purification of the greywater is typically not required, particularly for smaller scale systems.

Greywater reuse for flushing toilets typically must include a purification process such as chlorine or UV treatment.

Much of the efforts to legalize **greywater use** can be found in **arid areas of the country** that are prone to drought; the same is true on the international level where drought and water quality are serious issues. Therefore, a **majority of initiatives** worldwide related to greywater reuse **focus to a greater extent on irrigation issues** (for agricultural uses for example).

An example of rainwater and greywater reuse is located in Bucaramanga (Colombia) where **three alternatives** for the greywater and rainwater **harvesting** systems and their subsequent **reuse** are proposed trying to **balance end-user preferences and water availability**.





APPENDIX

Participatory techniques

In the following some of the most common existing participatory techniques with examples and images are briefly explained.

BRAINSTORMING

BRAINSTORMING			
What is?	Pros	Cons	Field of application
Relaxed, informal approach to problem solving with lateral thinking. It is a group creativity technique by which efforts are made to find a conclusion for a specific problem by gathering a list of ideas from the different members without criticizing other ideas and evaluate them at the end of the session.	Free and open environment that encourages everyone to participate. Brings team members' diverse experience into play. It allows members discovering new perspectives, defining problems and equal participation.	To be effective, it's important to approach it with an open mind and a spirit of non-judgment. If you don't do this, people "clam up," the number and quality of ideas plummets, and morale can suffer. A facilitator is required and it could be time consuming.	Very effective for short and concise ideas, when creativity and innovative ideas are needed. From 4 to 10 people, try to avoid larger group because the opportunity for everyone to contribute would be insufficient.



Operational procedure (<https://www.mindtools.com/brainstm.html>):

- 1. Prepare the group:** set up a comfortable meeting environment for the session. Make sure that the room is well-lit and that you have the tools, resources, and refreshments that you need. Choose one person to record the ideas that come from the session. This person shouldn't necessarily be the team manager (it is hard to record and contribute at the same time). Post notes where everyone can see them, such as on flip charts or whiteboards; or use a computer with a data projector. If people are not used to working together, consider using an appropriate warm-up exercise, or an icebreaker.
- 2. Present the problem:** Clearly define the problem that you want to solve, and lay out any criteria that you must meet. Make it clear that the meeting's objective is to generate as many ideas as possible. Give people plenty of quiet time at the start of the session to write down as many of their own ideas as they can. Then, ask them to share their ideas, while giving everyone a fair opportunity to contribute.
- 3. Guide the discussion:** Once everyone has shared their ideas, start a group discussion to develop other people's ideas, and use them to create new ones. Encourage everyone to contribute and to



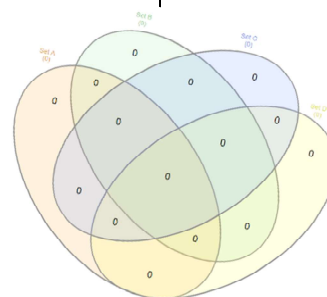
develop ideas, including the quietest people, and discourage anyone from criticizing the others. As group facilitator, you should share ideas if you have them, but spend your time and energy supporting your team and guiding the discussion. Welcome creativity, and encourage to come up with as many ideas as possible.





VENN DIAGRAMS

VENN DIAGRAMS			
What is?	Pros	Cons	Field of application
A Venn diagram is a type of graphic organiser and allow to see the relationships between two or more sets of items. It is a simple tool to provide a visual 'map' of the relationships between stakeholders. Useful to gain an understanding of the stakeholders and of the likely risk/issues/problems.	When working with a group developing a project it is especially useful in generating discussion around on the topic of relationships between stakeholders. Time efficient.	Can create confusion if the relationship between stakeholders is very complex.	It can be organised by a single person, the audience group varies from 10 to over 30 people.



A Venn diagram consists of overlapping circles. Each circle contains all the elements of a set. Where the circles overlap shows the elements that the set have in common. Generally there are two or more circles with the increasing complexity.

Operational procedure (<https://toolkits.dss.cloud/design/method-card/venn-diagram-2/>):

1. Collect all the information you have at the moment.
2. Start clustering information and arrange it in groups.
3. Organise the information by drawing a circle and placing the clustered information in the circle.
4. Repeat the previous step for each of the information clusters.
5. Some information will overlap across different clusters, make sure you place the information in the intersection between the different circles.
6. Review if all the information has been placed, some information might have to be placed in a different cluster or a cluster will have to be divided in sub-clusters.
7. Analyse the diagram and work on the way it is displayed, this could be done quickly on paper or by using a graphic design computer program. There are online free tools to create the Venn diagram, the following website is an example: <http://www.interactivenn.net/> .

The following Venn diagram has been taken from: <http://www.circularecology.com/sustainability-and-sustainable-development.html#.XZX3IkYzZPY>.

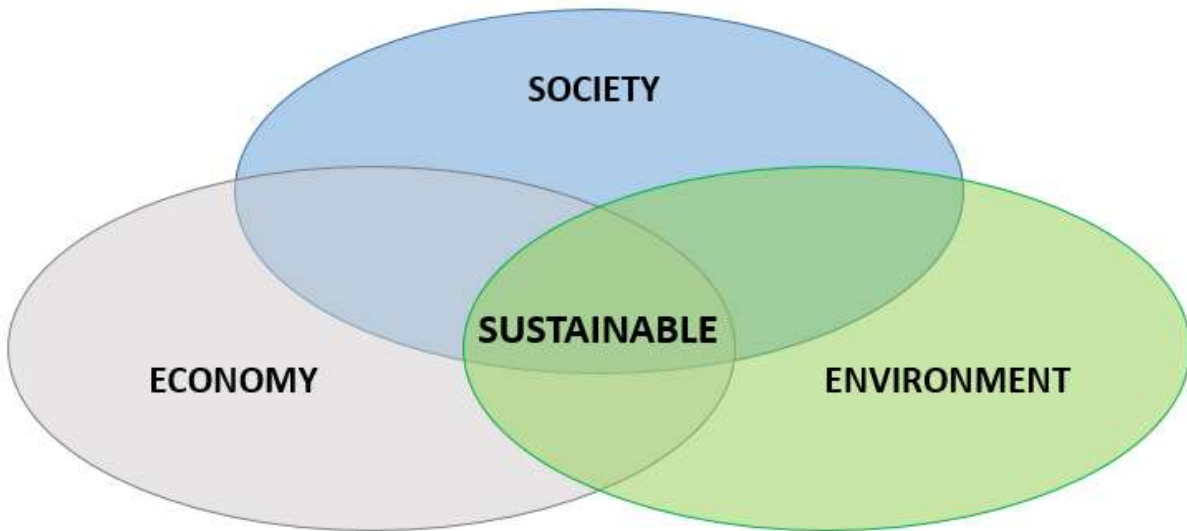
Starting from the definition of sustainability as: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs (The United Nations Brundtland Report in 1987)", they built the corresponding Venn diagram, this technique have been used to illustrate how sustainable practices must simultaneously meet human needs, environmental health, and deliver prosperity and the interconnections between them. Therefore, to achieve true sustainability we need to balance economic, social and environmental sustainability factors in equal harmony. Taking these three pillars of sustainability further if we only achieve two out of three pillars then we end up with:

- Social + Economic Sustainability = Equitable

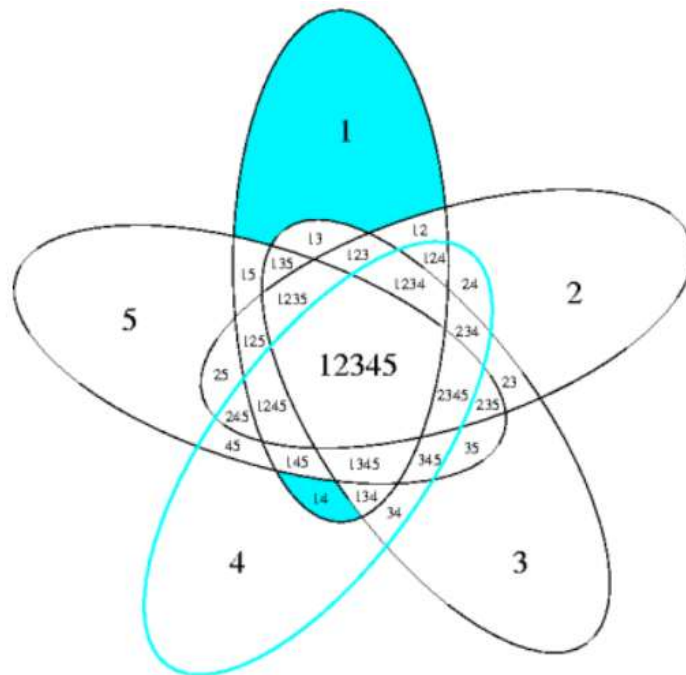


- Social + Environmental Sustainability = Bearable
- Economic + Environmental Sustainability = Viable

Only through balancing economic + social + environmental can we achieve true sustainability and a truly circular economy.



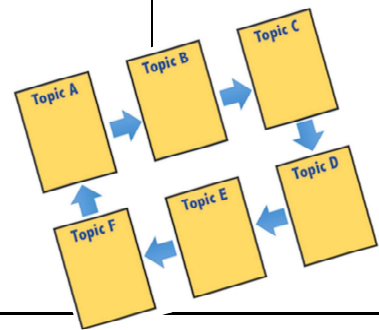
The possible relationships and intersections inside a Venn diagrams with five sets are shown in the example below:





CAROUSELS

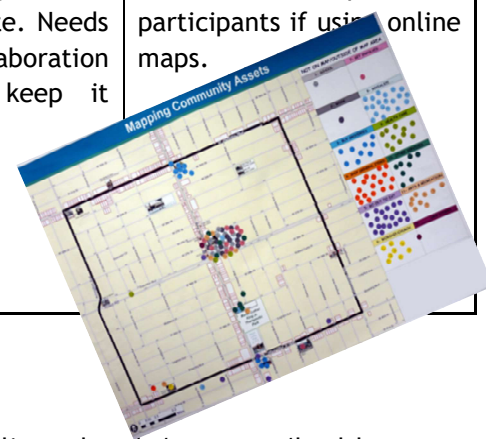
CAROUSELS			
What is?	Pros	Cons	Field of application
<p>Each cooperative group walks up to an open-ended question posted on chart paper, discusses it, brainstorms answers or solutions, and writes down responses within a given amount of time. They repeat the exercise with a new question. This time they must read the responses from the previous group(s) before they begin to write down new ideas.</p>	<p>Possibility to analyse more than one problem, wide range of scenarios can be tested with the possibility to "learn" from the other group responses.</p>	<p>Lack of participation on the activity with group members, isolation. Time consuming if there are a lot of participants. Avoid group too large.</p>	<p>Designed for students or classroom workshops. Making groups with no more than 5/6 people for no more than 6 stations.</p>





COMMUNITY/ASSET MAPPING

COMMUNITY/ASSET MAPPING			
What is?	Pros	Cons	Field of application
Set of approaches and techniques that combines the tools of modern cartography with participatory methods to represent the spatial knowledge of local communities. Community groups map assets in their local area and develop their own neighbourhood action plans.	Better understanding of community priorities and create neighbourhood action plans, which make the best use of the local assets. Can generate a lot of community participation.	As the individual assets cannot be plotted onto a geographical map, this kind of mapping is not always appropriate. Needs community collaboration and needs to keep it updated.	The breakout groups should be made up of 10-12 participants each if using table-sized maps, 4-5 participants if using online maps.



Operational procedure
[data/trainings/Documents/tw_cba20.pdf](https://healthpolicy.ucla.edu/programs/health-data/trainings/Documents/tw_cba20.pdf):

([https://healthpolicy.ucla.edu/programs/health-](https://healthpolicy.ucla.edu/programs/health-data/trainings/Documents/tw_cba20.pdf)

1. Define community boundaries
2. Identify and involve partners: involve key people with a stake in your issue and enough people (community residents, organization staff, or volunteers) to complete all the activities needed to finish the asset map
3. Determine what type of assets to include
4. List the assets of groups: make an inventory of all the groups (associations, organizations, and institutions) in your community
5. List the assets of individuals: another technique is to compile the assets of individuals. This approach can be more challenging as there are many more people than groups. You can get some of this information from key stakeholders. You can also develop a door-to-door survey to identify individual assets. However, surveying the community in such a way is expensive and time consuming.
6. Organize assets on a map





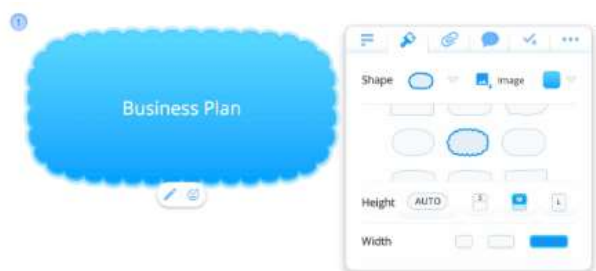
MIND MAPS

MIND MAPS			
What is?	Pros	Cons	Field of application
It is a powerful note-taking method. They not only highlight important facts, but also show the overall structure of a subject and the relative importance of individual parts of it. Mind Maps are more compact than conventional notes, and often take up just one side of paper. This helps you to make associations and to generate new ideas. You can also add new information easily, even to a Mind Map that you've already drawn. They are also good for refreshing information in your mind.	Supports learning, improves information recording, shows how different facts and ideas are related, and enhances creative problem solving. Use of a two-dimensional structure, instead of the list format conventionally used to take notes. This makes information easier to remember, as it's held in a format that our minds find easy to recall and quick to review.	They cannot deal with more than one central topic. If it is not carefully constructed and managed it can cause a lot of confusion to become apparent, which can be a major drawback for research. If your mind map becomes too large it may also hinder your analytic skills.	Very powerful tool to organise and deal with a huge group of people during meetings. Displaying the mind map on a screen (or sharing it in an online meeting) allows participants to discuss points, add action items, set deadlines, and make decisions. All of these can be recorded on the mind map, which is then shared electronically after the meeting ends.

A Mind Map is a visual thinking tool that can be applied to all cognitive functions, especially memory, learning, creativity and analysis. Mind Mapping is a process that involves a distinct combination of imagery, colour and visual-spatial arrangement. The technique maps out your thoughts using keywords that trigger associations in the brain to spark further ideas.

Operational procedure (<https://www.ayoa.com/how-to-mind-map/>):

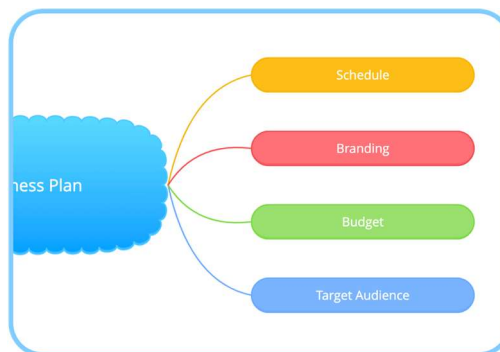
1. **Create a central idea:** It is the starting point of your Mind Map and represents the topic to explore. The central idea should be in the centre of the page and can include an image or colour that fits with Mind Map's topic. This draws attention and triggers associations, as our brains respond better to visual stimuli, therefore it is very important to associate to the central idea an image or a picture.



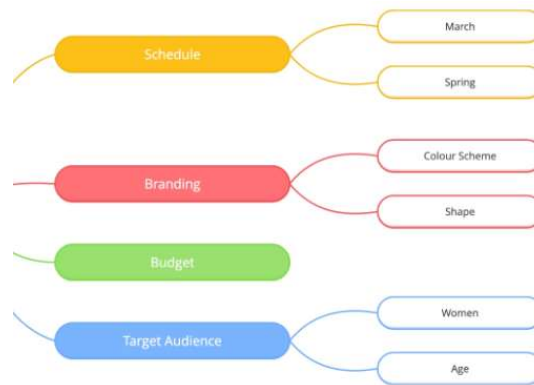
2. **Add branches to the map:** The next step to get your creative juices flowing is to add branches (without restriction) radiating outwards from the central topic. The main branches which flow from the central image are the key themes. You can explore each theme or main branch in greater depth by adding child branches.



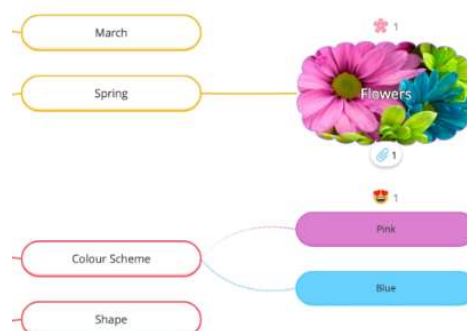
3. **Add keywords:** When you add a branch to your Mind Map, you will need to include a key idea. Try to keep this idea as brief as possible. The use of keywords triggers connections in your brain and allows you to remember a larger quantity of information.



4. **Colour code branches:** Colour coding links the visual with the logical and helps your brain to create mental shortcuts. It allows you to categorize, highlight, analyse information and identify more connections which would not have previously been discovered.

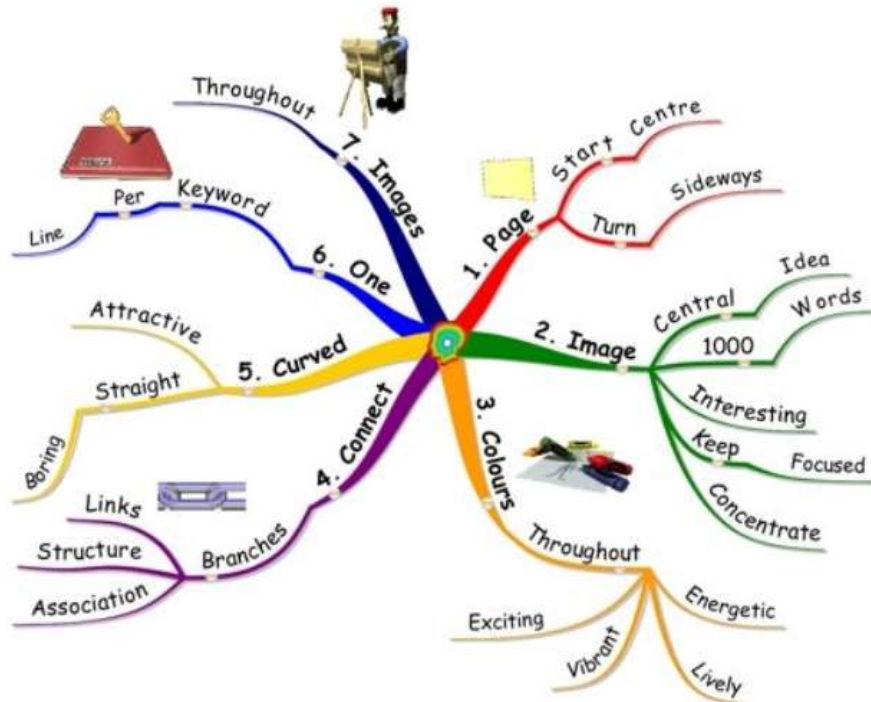
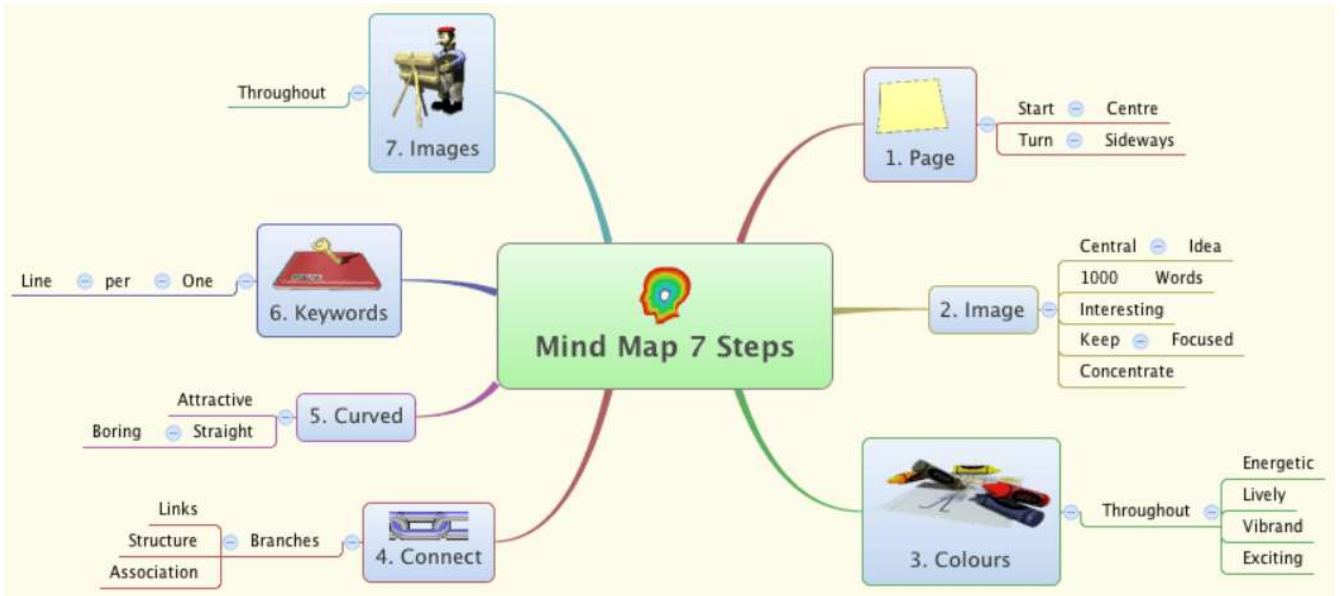


5. **Include images in the map:** Images have the power to convey much more information than a word, sentence or even an essay. They are processed instantly by the brain and act as visual stimuli to recall information, images are a universal language which can overcome any language barrier.





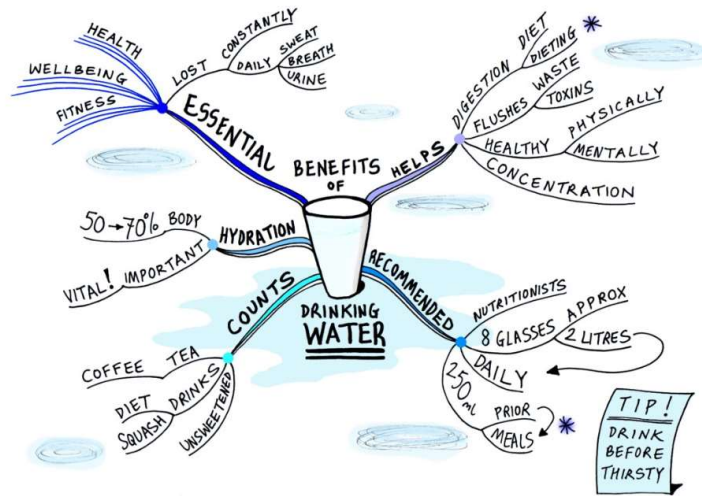
Below there is one example where two mind maps, with different format, are expressing the same concept (steps needed to build and efficient and effective Mind Map) (source: <http://www.usingmindmaps.com/how-to-mind-map-in-seven-steps.html>):



The example above shows how mind maps can have different configuration but they can express the same concept in a different way.

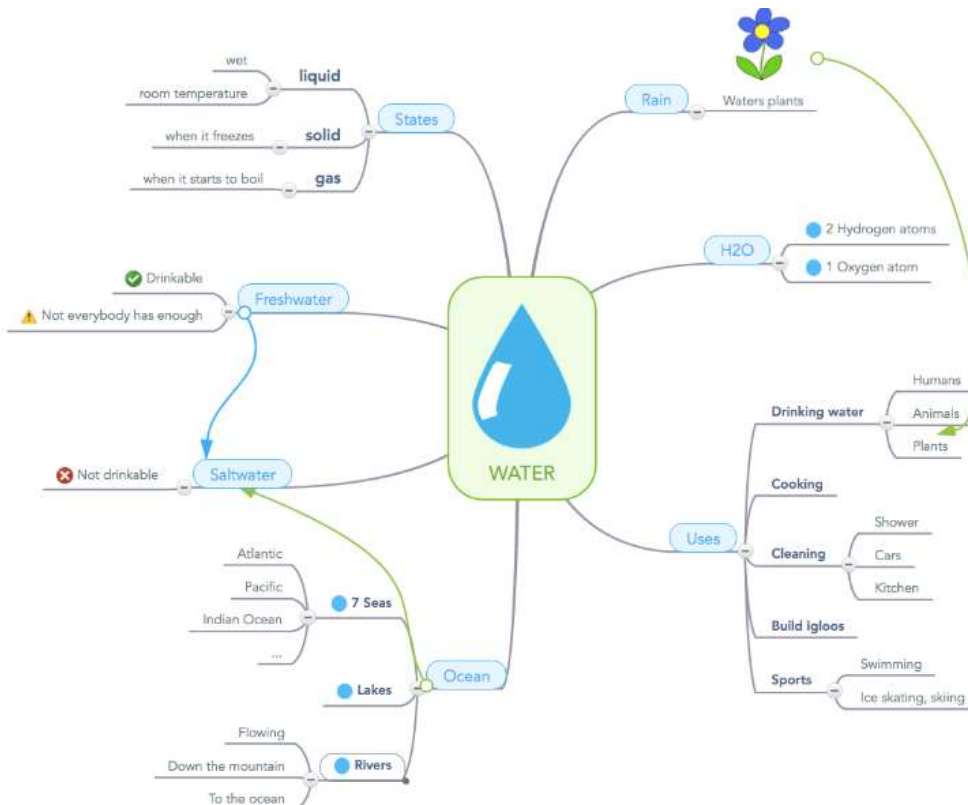
The mind map below has been taken from: <http://rethinkyourdrink.blogspot.com/2011/04/benefits-of-drinking-water-mind-map.html>.

This mind map highlights some of the great benefits of drinking water. Starting from the central topic, different aspects are pointed out as why it is recommended, why it is essential for human being and where are the main advantages for people. The way to build this type of diagram is to focus on the central topic and then develop the branches with everything is connected with the central subject.



© Paul Foreman <http://www.mindmapinspiration.com>

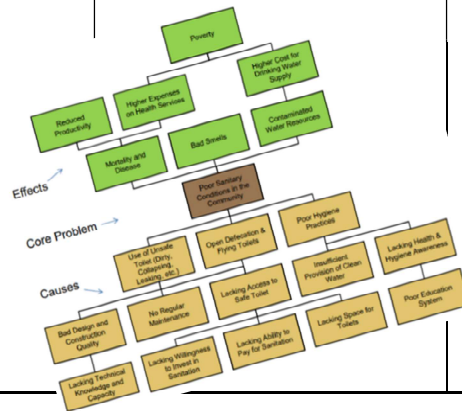
The central topic of the following mind map is the concept of water in general. Starting from that, the uses, its composition, its states and in which form is available on the earth are discussed.





PROBLEM TREE ANALYSIS

PROBLEM TREE ANALYSIS			
What is?	Pros	Cons	Field of application
<p>Find solutions by mapping out the anatomy of cause and effect around an issue in a similar way to a Mind map, but with more structure. It is important that factors can be added as the conversation progresses. The first step is to discuss and agree the problem or issue to be analysed. The heart of the exercise is the discussion, debate and dialogue that is generated as factors are arranged and re-arranged, often forming sub-dividing roots and branches (like a Mind map). Take time to allow people to explain their feelings and reasoning, and record related ideas and points that come up on separate flip chart paper under titles such as solutions, concerns and decisions.</p>	<p>The problem can be broken down into manageable and definable chunks. This enables a clearer prioritisation of factors and helps focus objectives. It identifies the constituent issues and arguments, and can help establish who and what the political actors and processes are at each stage.</p>	<p>There is tendency to focus only on the problems that have been mentioned, other important problems are often ignored as a result. The problem tree gives no indication of the “magnitude” of the problem. The implication is that all problems are seen as being equally important. Users must have the knowledge and skills to use it and they must also understand the project environment.</p>	<p>The problem, objective and strategy tree analysis is one participatory tool of mapping out main problems, along with their causes and effects, supporting project planners to identify clear and manageable goals and the strategy of how to achieve them.</p> <p>Problem tree analysis is best carried out in a small focus group of about six to eight people using flip chart paper or an overhead transparency.</p>



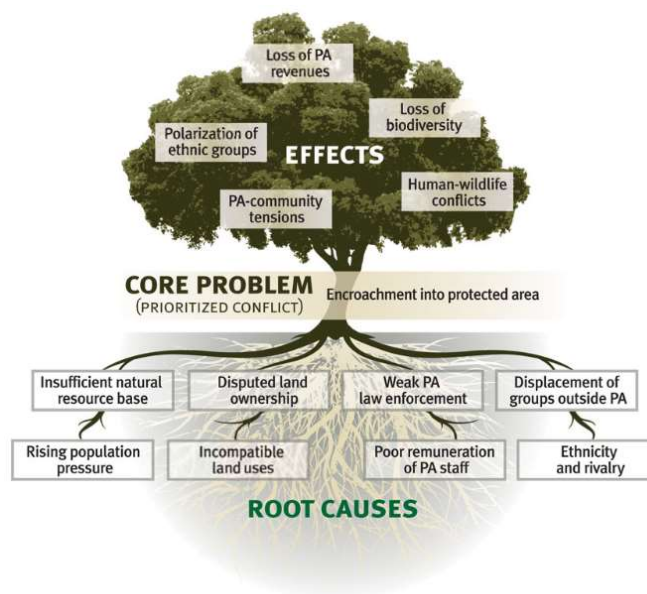
Operational procedure (<http://www.managingforimpact.org/tool/problem-tree-0/>):

1. Brainstorm on the problems: Write down the problems, one per card. All participants should take turns to say what they think the perceived problems are. Try to be very specific when describing the problems
2. Put the card with the core problem (or 'starter problem') at the top of the model. The core problem is the one with most of the underlying problems and the one with the serious effect(s)
3. Identify direct causes of the starter problem. Place these underneath the starter problem
4. Check whether the direct causes independently lead to the starter problem.
5. Identify direct effects of the starter problem. Place these above the starter problem
6. Check whether the direct effects independently result from the starter problem
7. Identify underlying causes of the 'direct causes', starting from left



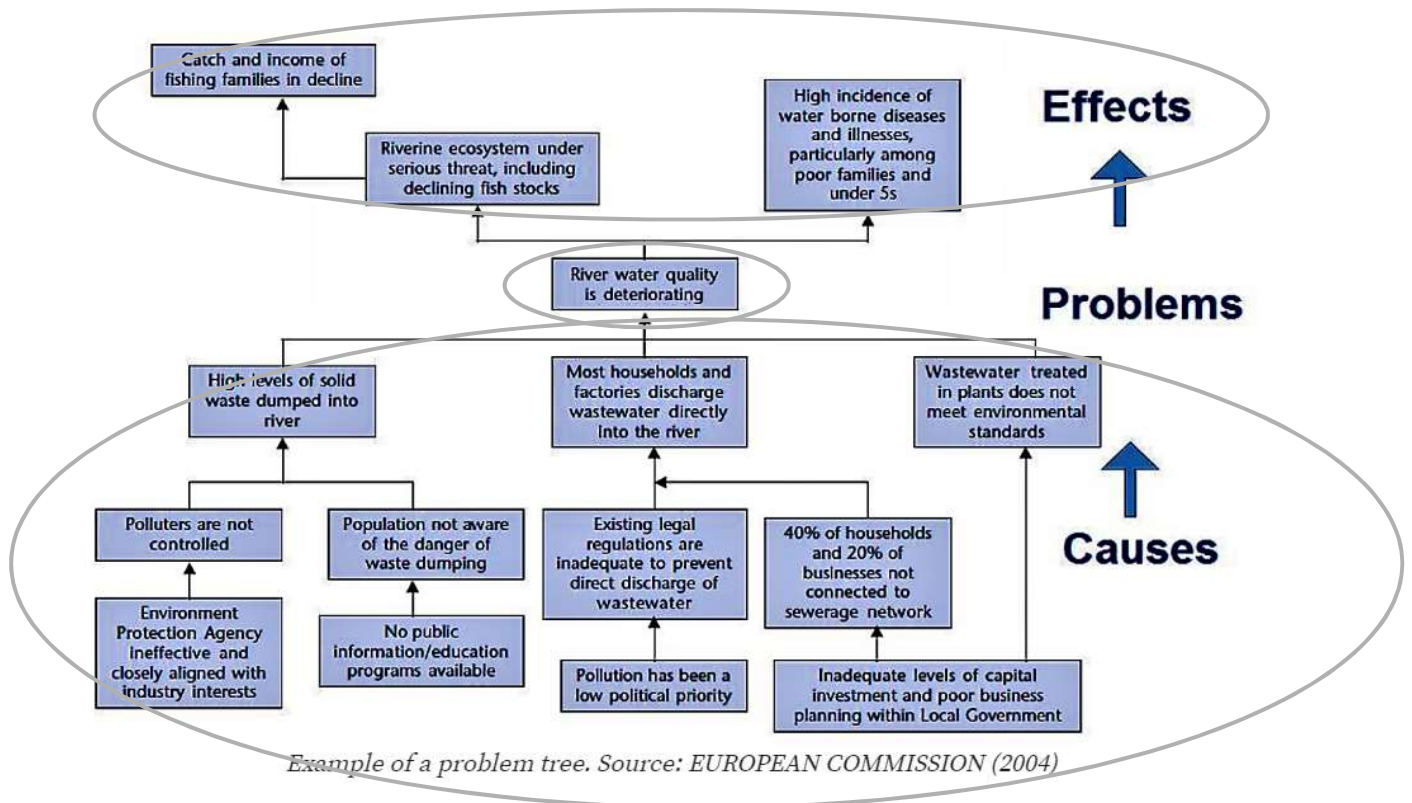
8. Check whether these causes are also independent.

The following problem tree analysis has been taken from: <https://www.iisd.org/topic/environment-conflict-and-peacebuilding>. The analysis is structured as follow: by highlighting the root causes the core of the problem is analysed and then the effects produced by the problem are pointed out. The final aim here is to promote the central role of ecosystem management and natural resource governance to move fragile societies onto pathways of resilience.



The following problem tree analysis example has been taken from: <http://archive.sswm.info/category/planning-process-tools/exploring/exploring-tools/preliminary-assessment-current-status/prob>.

It deal with the problem of river pollution, by mapping out the main problems, along with their causes and effects, it wants to support project planners to identify clear and manageable goals and the strategy of how to achieve them.





MULTI CRITERIA DECISION MODELLING

MULTI CRITERIA DECISION MODELLING			
What is?	Pros	Cons	Field of application
<p>MCDA is both an approach and a set of techniques, with the goal of supporting the choice of an alternative over a set of alternatives. The alternatives may differ in the extent to which they achieve several objectives, or criteria, and no one option will be obviously best in achieving all objectives. This means that the criteria are conflicting. MCDA is a way of looking at complex problems that are characterised by any mixture of monetary and non-monetary objectives, for instance environmental and social. MCDA breaks the problem into more manageable pieces to allow data and judgements to be brought to bear on the pieces, and then of reassembles the pieces to present a coherent overall picture to decision makers.</p>	<p>Aid the thinking process and the decision making. Very powerful tool.</p>	<p>The process can be long and costly, and not always easy to understand.</p>	<p>Decisions implying the choice among alternatives taking into consideration multiple conflicting criteria.</p>

Figure 6.1 Applying MCDA: Detailed steps

- 1. Establish the decision context.**
 - 1.1 Establish aims of the MCDA, and identify decision makers and other key players.
 - 1.2 Design the socio-technical system for conducting the MCDA.
 - 1.3 Consider the context of the appraisal.
- 2. Identify the options to be appraised.**
- 3. Identify objectives and criteria.**
 - 3.1 Identify criteria for assessing the consequences of each option.
 - 3.2 Organise the criteria by clustering them under high-level and lower-level objectives in a hierarchy.
- 4. 'Scoring'. Assess the expected performance of each option against the criteria. Then assess the value associated with the consequences of each option for each criterion.**
 - 4.1 Describe the consequences of the options.
 - 4.2 Score the options on the criteria.
 - 4.3 Check the consistency of the scores on each criterion.
- 5. 'Weighting'. Assign weights for each of the criterion to reflect their relative importance to the decision.**
- 6. Combine the weights and scores for each option to derive an overall value.**
 - 6.1 Calculate overall weighted scores at each level in the hierarchy.
 - 6.2 Calculate overall weighted scores.
- 7. Examine the results.**
- 8. Sensitivity analysis.**
 - 8.1 Conduct a sensitivity analysis: do other preferences or weights affect the overall ordering of the options?
 - 8.2 Look at the advantage and disadvantages of selected options, and compare pairs of options.
 - 8.3 Create possible new options that might be better than those originally considered.
 - 8.4 Repeat the above steps until a 'requisite' model is obtained.



OPEN SPACE (UNCONFERENCE METHOD)

OPEN SPACE (UNCONFERENCE METHOD)			
What is?	Pros	Cons	Field of application
<p>It is a highly democratic meeting framework that allows unlimited numbers of participants to form their own discussions around a central theme, and to discuss the subthemes which they consider the most important. Participants start by sitting in a circle and decide themselves on the issues to discuss, using a simple procedure. The process usually guided by a facilitator who also introduces the democratic rules of the technique. Workshop sessions in the chosen issues are self-managed by the participants within a framework of simple principles and democratic 'laws'. Each workshop session creates required list of actions and who should take them. Then session groups report back to the wider public.</p>	<p>Unlimited number of participants. Participants create and manage the agenda themselves.</p>	<p>Time needed, expensive.</p>	<p>The approach can be used for most issues and should give equal opportunities for everybody involved. "Open Space" is a technique for running meetings where the participants create and manage the agenda themselves. Sessions can be for between five to 2000 plus people (providing you have a big enough venue). This method is ideal if you want participants to gain ownership of an issue and come up with solutions. Participants agree on the areas of discussion that have importance for them and then take responsibility for facilitating the sessions.</p>

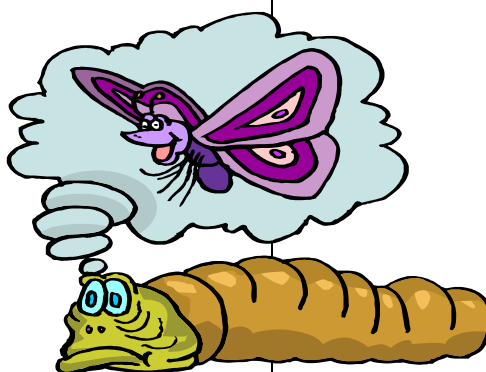




For better explanation of the open space method, please visit: <http://peggyholman.com/wp-content/uploads/2010/04/ToolsForOpeningSpace.pdf>

EUROPEAN AWARENESS SCENARIO WORKSHOP (EASW)

EUROPEAN AWARENESS SCENARIO WORKSHOP (EASW)			
What is?	Pros	Cons	Field of application
<p>The EASW is a method created in Denmark and then adopted by the European Commission, to find agreements between the various stakeholders within a local scope; originally it was used for identifying future scenarios for sustainable urban living.</p> <p>It consists of a 2 days meeting involving 24-30 people, including these 4 categories:</p> <ul style="list-style-type: none"> - politicians/decision makers, - commerce and industry representatives, - technicians/experts, - citizens <p>It is organized in two steps:</p> <p>1-Development of visions for the future : each group of interest develops his best and worst scenario. Scenarios are then discussed in a plenary session and the common vision of the participants is built.</p> <p>2-Ideas for the realization of the vision: participants are divided in four thematic groups (e.g. wastes, energy, water, lifestyle) to propose, with the help of a number of techniques,</p>	<p>Good method to initiate a multipartner dialogue, to include new stakeholders in the (water) policy debate, and to promote learning between participants. It seems to be a good method for the upstream, preparatory, capacity-building tasks of a planning process.</p>	<p>Not always well suited to resolve conflicts and aid decisions in the face of scientific complexity and uncertainty.</p> <p>Consensual agreements or action plans can be difficult to achieve.</p>	<p>The initiative focused on two particular fields of action which, in the opinion of experts, should benefit the most from the introduction of the European dimension:</p> <ul style="list-style-type: none"> -Assessing the transferability of best practices between different cultural and political contexts, including identification of conditions for success. -Identification and further development of instruments and tools to support the know-how transfer processes.





<p>concrete ideas on how to achieve the common vision, including who will take responsibility for their implementation. Each group selects a limited number of ideas (usually 5). The ideas are presented in a plenary session to be discussed and voted.</p>			
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Additional and more detailed explanation are available online on the website: <https://www.valutazione.net/saperi/strumenti-e-metodi/scenario-workshop-easw/>.

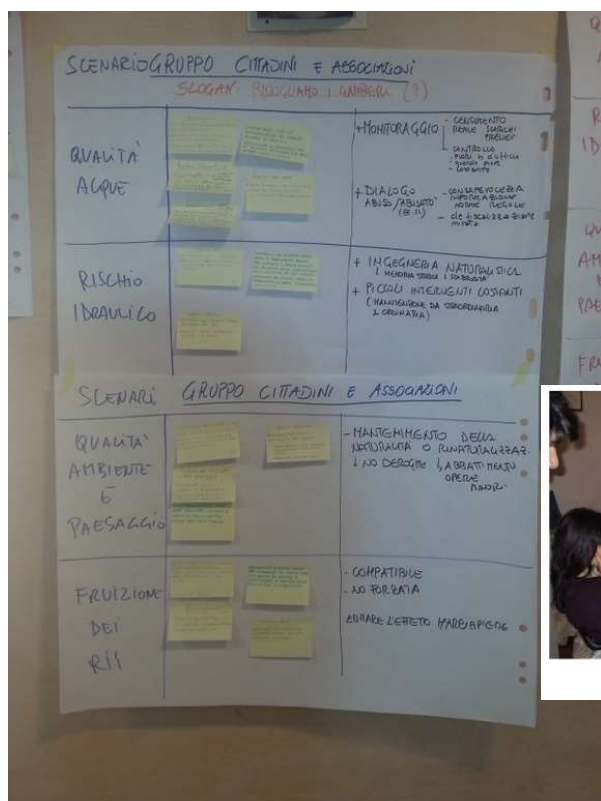


Figura 4. Il lancio di idee