Integrated Solutions for Water, Energy, and Land (ISWEL)

International Institute for Applied Systems Analysis

PARTICIPATORY CO-DESIGN OF SUSTAINABILITY PATHWAYS

Guidebook for designing and running online workshops

ABOUT THE ISWEL PROJECT

This guidebook has been created within the Integrated Solutions for Water, Energy, and Land NEXUS (ISWEL) Project led by the partnership between the International Institute for Applied Systems Analysis (IIASA), the Global Environment Facility (GEF), and the United Nations Industrial Development Organization (UNIDO). The overall goal of the ISWEL project is to develop tools and capacities to support the management of the water, energy and land nexus. The project takes a global approach but also zooms into two transboundary basins facing important development and environmental challenges: Zambezi and Indus.

The ISWEL project established partnership with stakeholders in the Indus and Zambezi basins to develop an integrated assessment modeling tool that can be used to identify long term cost-effective solutions to meet water, energy and land development goals in an integrated manner. Alongside, the partnership has also developed a number of participatory tools, including a scenario planning and a nexus simulation tools, aiming for technical and non-technical audiences to build a common understanding about the sectoral challenges and interlinkages across the three sectors (WEL) in the basin, and gain a practical and hands-on experience on future scenarios and pathways.

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OVERVIEW

The guidebook is meant as a practical introduction and step-by-step instruction to designing and running participatory scenario development - the process that we also call policy simulations. The process has been developed to bridge the gap between science, policy, and society. Scientific knowledge about sustainability challenges has been used to develop multiple global scenarios. However, stakeholder engagement in scenario development is often misunderstood as a way to bring expert input to scientists and provide feedback to research results. If scenario efforts are to be useful for policy development, they need to clearly indicate the sphere of control where stakeholders representing specific decision unit(s) can develop robust strategies. The Policy Simulation process allows them to develop strategic insights by building on selected representations of real-world structures and processes. The guidebook provides a necessary basis to understand the process, so that readers can use it, adapt it to specific circumstances, and successfully execute it.

During the Integrated Solutions for Water, Energy, and Land (ISWEL) project, scenarios were initially co-developed during face-to-face workshops. However an unexpected turn of events, induced by the COVID--19, dramatically increased the need to organize workshops remotely using online tools. Within the last months of the project, we have designed and tested ways to design and facilitate online workshops with policy simulations. As the guide includes an extended section on adapting policy simulations to the online environment, it is especially relevant where social distancing is imposed. It is important to note that many other factors, such as a growing need for decisive climate action, can make this online mode more important than ever.

The guide is designed as a manual for organizations interested in using policy simulations, whether face-to-face or online. This includes organizations directly or indirectly involved in the process of policy development, especially in the context of various crises, such as climate emergency, biodiversity loss, rise in populism, and many others. The methodology strongly emphasizes the positive, active, and inclusive approaches of co-creating sustainability pathways to desired futures.

The guidebook will:

- explain the assumptions underlying the co-creation of scenarios and pathways,
- compare and contrast them with other, similar tools,
- instruct how to adapt and design new policy simulations,
- explain how to run policy simulations in face-to-face workshops,
- show how to run them online.

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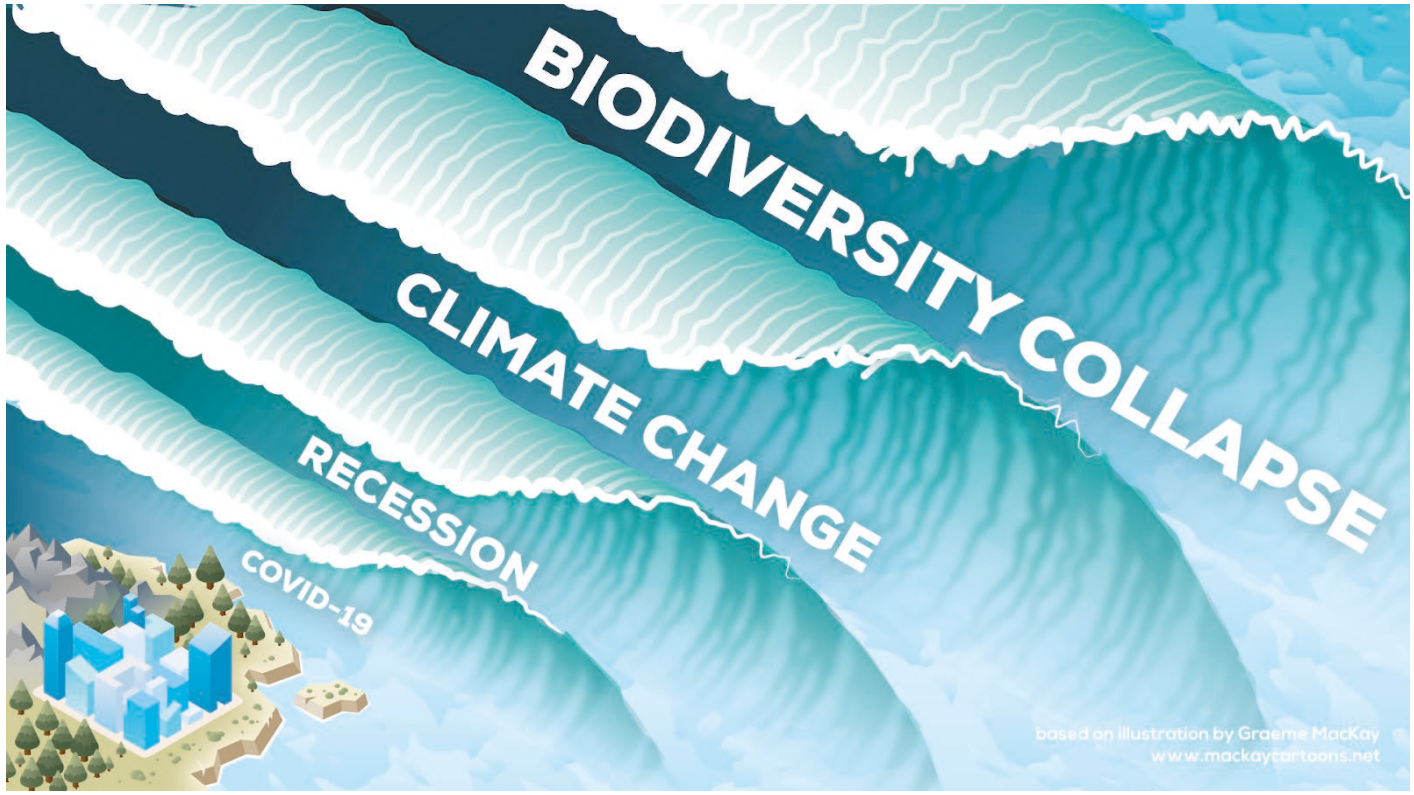


INTRODUCTION

The age of multiple crises: climate, biodiversity, populism, and others

Living in a world of unprecedented global challenges, each and every one of us has stakes in the future. Behind the most recent crisis of the COVID-19 pandemic, other, more perilous emergencies loom on the horizon: economic recession, climate change, biodiversity collapse, and more. But despite anticipating them, we, as stakeholders of the Earth, are unable to craft a consistent, unified response.

The reason for this is three-fold. First, the challenges are intricately complex, to the extent that even our best attempts to tackle them often fail or lead to unexpected side-effects. Consequently, we are left with a feeling of uncertainty, especially about making decisions with a long-term perspective in mind. To make matters worse, everyone's judgement is warped by their different interpretations of reality, personal values, and worldviews - a widespread ambiguity over the right diagnoses and solutions. As a result, we not only fail to see both the big picture and the interconnections between its elements but also are unable to initiate the necessary collaboration between different fractions of polarized society.

All of the above points to the need to find a new approach to navigate complexity and keep uncertainty at bay, and to communicate effectively in spite of ambiguity. Two fields in particular seem instrumental to finding this approach: science and policy. Their successful union may be one of the keys to our success.

At first sight, however, they could not be any more different. Consider scientists. They use the rational model to discover facts about the natural world. They report their findings in scientific papers, using obscure language that needs to be translated for a layperson to understand it. Finally, they enjoy ample time to conduct their activities and don't feel pressured for immediate results.

Conversely, the reality of policy makers is quite opposite. First and foremost, they seek popular support, as it validates their existence. Their job is to respond to emergencies, and in doing so often resort to compromise regardless of factual information. Their communication is replete with acronyms. Lastly, they work under time pressure and often sacrifice quality for the sake of promptness.

However, upon closer examination one cannot help but notice that science and policy would complement each other perfectly. Informed by scientific insight that maps complexity and dispels ambiguity, policy makers could use their authority to make crucial decisions, put them into practice, and communicate them without uncertainty.

Seeing that policy makers represent entire societies, it goes without saying that it would benefit us all if science and policy could speak as one. Before that happens, however, in looking to both of them we are bound to receive contradictory guidance on the right course of action. But if science and policy could put together the puzzle whose pieces are divided between them, we would be able to see a comprehensive view of the situation.

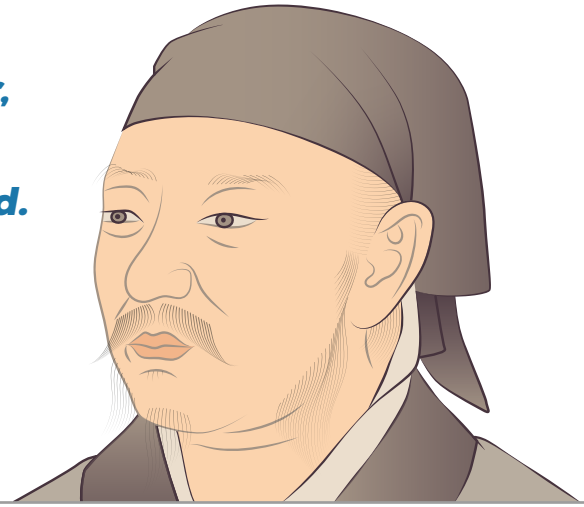
Fortunately, the marriage between science and policy can be arranged with the aid of proper matchmakers – such as policy simulations.

Tell me and I forget,

Show me and
I may remember,

Engage me and
I will understand.

Xunzi



The case for stakeholder engagement

Stakeholder engagement became increasingly important in research and practice for social-ecological systems. The trend is very strong and clear – for example adaptive management (scientists and policy-makers working together on a more experimental approach to decision making) evolved into adaptive co-management (broad engagement of stakeholders focused on deliberation). Anybody who is affecting or is affected by current decisions and potential future events is a stakeholder who should be involved in the decision process. As we saw, this process can be informed by a combined input of science and policy. However, information alone is not enough to make stakeholders act. For that, they need to be actively engaged, their knowledge, experience, and ideas for solutions, considered as an input. What's more, with the right level of engagement, decision making can become something more than just an attempt to solve a problem. It can foster long-term thinking and create insights that spread beyond its original domain.

Guidebook audience

The tools and techniques explored in this guidebook can be used by practitioners in disaster risk management, climate adaptation, and broadly sustainable development, in order to engage broad audiences, foster discussion about important societal challenges, and create an environment for co-design of solutions. The guide also constitutes a valuable resource for people interested in experiential learning and facilitation of online workshops. The guidebook offers background and insights on the policy simulation methodology, explains how to adapt it in developing workshops for different needs and goals, and to share practical tips for effective engagement and facilitation.

COVID-19 challenges and shift towards remote collaboration

COVID-19 restrictions quickly thrust most organizations and companies into moving all of their events to the virtual world and using online tools to host and lead them. But the changes brought about by COVID-19 in the way people do their work are predicted to remain with us in the long run.

This guidebook presents our experience of conducting an interactive online workshop in the age of COVID-19 situation and lockdown. It is a result of activities developed and implemented throughout Andalusia - Forging Resilient Regions (Deep Demonstration) project coordinated by the Climate Knowledge and Innovation Community (Climate KIC) funded by EIT. By creating this guidebook, we want to share our approach to designing and using policy simulation, and to allow others to adapt it to their specific needs.

Tools and methodology described in this guidebook are based on experiential and social learning that aims to address complexity in a novel way. It combines elements from systems mapping, scenarios, and gaming, which allows for greater involvement of participants and stimulates a broader understanding of the problems and novel ideas for solutions.

Systems mapping exercise in Miro board

Restrictions caused by the pandemic have presented new challenges for any type of workshops, collaboration and knowledge transfer activities, both in design and delivery. In order to convert in-person activities to a virtual setup, we needed to re-think the experience and re-develop the methodology and organization of the workshop.

In this guidebook we will go over what policy simulations are, their applications and use cases. We will describe how to design and adapt them to specific needs, as well as how to run them, both in-person and online.

BACKGROUND

What are Policy Simulations?

A policy simulation, also called 'Policy Exercise' or 'Strategic Simulation' (Duke and Guerts 2004), is an interactive, participatory activity, similar to a role--playing game. Its target users are stakeholders concerned about the future of a region or an organization. The simulation allows them to develop strategic insights by building on selected representations of real-world structures and processes. By taking part in simulations, they can develop several alternative strategies, also called "pathways", that are robust to a range of (external) scenarios (Notten 2006). This co-creation process helps them understand both the key challenges on the way to their desired futures, and the solution options (policy interventions) required to overcome them.

Policy simulations build on the scenario methodology. Scenarios are useful in supporting policy-making processes at different stages. Many reviews and evaluations of past scenario processes demonstrate that they have been quite successful, especially in the business context, in supporting strategic decision-making at all stages of the policy cycle (Volkery and Ribeiro 2009). By exploring different scenarios, participants can prepare for a wide range of future possibilities informed by existing development plans, visions and strategies. However, despite this potential, both research and practice expose many problematic areas in the scenario methodology, especially when it is applied in global contexts.(Van Notten et al. 2003).

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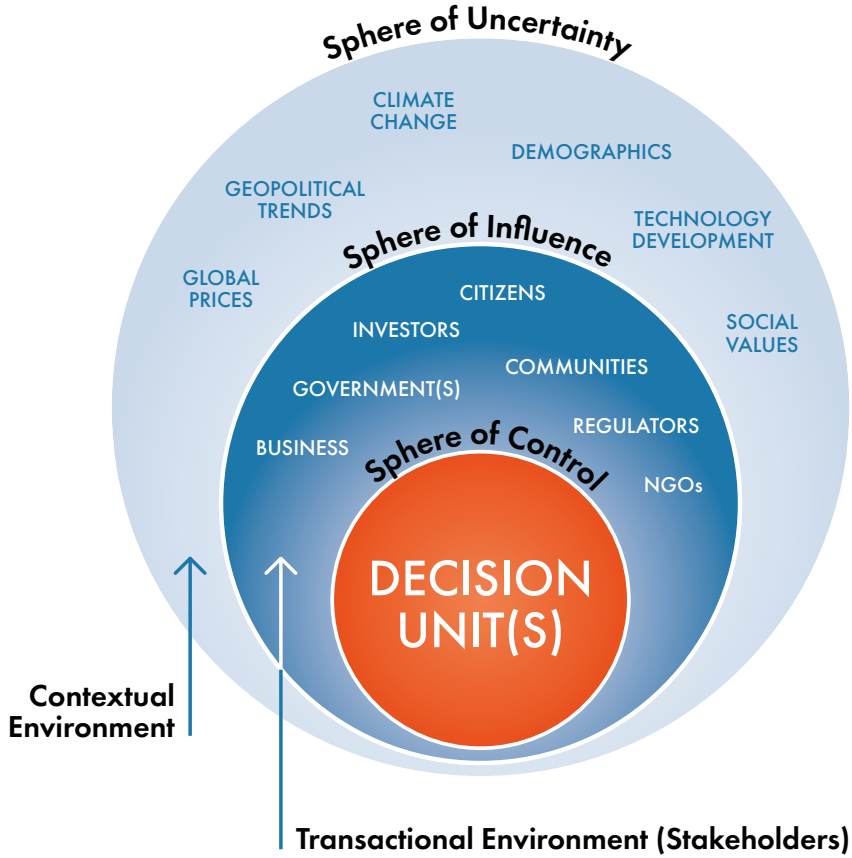
One of such challenges is to address the specific needs of diverse participants that are willing to find a promising future for their localities even against challenging global trends (Parsons 2008).

In a typical scenario building process, participants should jointly delineate two spheres. One is their internal sphere of influence, i.e.: the context in which they can effectively make decisions and develop policies. The other is an external sphere of uncertainty, i.e.: a space where they need to agree on the most important drivers and constraints that result in various opportunities and threats affecting the internal sphere.

For the purposes of policy simulations, one should identify the decision unit(s) (Zurek and Henrichs 2007), or stakeholders. They can range from a small organization to a large country or region, large river basin, or a group of countries (e.g. EU). Within the decision unit's sphere of influence, participants jointly co-design pathways to their desired future. These pathways need to be made robust against the various scenarios within the sphere of uncertainty.

Policy simulations are a tool that has been applied to a diverse range of topics and areas, such as: flood risk on the River Thames (Lonsdale et al. 2008); extreme sea-level rise due to climate change (Toth and Hizsnyik 2008, Poumadère et al. 2008); social aspects of river floodplain management (Stefanska et al. 2011); international management of global climate change (Parson, 1995); European climate policy (Haug, Huitema & Wenzler, 2011); systemic liquidity crises in banking (Gai, Haldane & Kapadia, 2011); climate policy as business opportunity for venture capitals in Europe (Kasemir, Toth & Masing, 2000); reorganization of the British National Health Care System (Harvey, Liddell & McMahon, 2009); developing science policy for the Great Lakes Ecosystem (Duke, Geurts & Vermeulen, 2007); deregulation of railroads in the USA (Duke, Geurts & Vermeulen, 2007).

SCENARIOS TO SUPPORT POLICY



Decision units (stakeholders) and their relation to the three spheres relevant to policy simulations

HOW POLICY EXERCISES WORK

1 PROBLEM

Participants face a complex, real-world challenge that calls for innovative, strategic decision making and requires the integration of a wide range of data, insights, and tacit knowledge.

2 DIFFERENT PERSPECTIVES

The policy simulation provides an accessible representation of the problem and connects stakeholders with diverse backgrounds, values, tasks, and goals. Together, they can explore the issue from a number of perspectives.

3 COMMUNICATION

The unique setting allows participants to engage in brainstorming, consulting, or negotiating processes to identify problems, barriers, and solutions. This leads to a free exchange of ideas and bridges communication gaps.

4 COMPLEXITY

Through a step-by-step process of exploring variables, identifying interconnections, testing possible solutions, and observing their outcomes, the problem becomes visible in its entirety.

5 CREATIVITY

Participants discover their creative potential and go off the beaten track. Abstract ideas become tangible, opening new, original, and inspiring pathways into the unknown.

6 CONSENSUS

In the safe environment of the simulation, participants are more empathetic, trusting, and inclined towards cooperation. Thus, even if debates become heated, all voices are heard, trade-offs negotiated, and a joint strategy adapted.

7 COMMITMENT TO ACTION

Stakeholders recognize their own responsibility within complex systems and realize that they have enough experience, knowledge, and determination to use their newly gained insights to face real-life challenges.

Participants of policy simulations explore actual policy issues, work with real--world data, and assume roles reflecting the ones they have in reality. At the same time, design elements derived from serious games facilitate communication between participants (Duke et al. 2007) and enable them to get feedback on their decisions. (Harvey, Liddel, & Mcmahon 2009). Thanks to this sophisticated approach, even participants without relevant academic backgrounds can successfully engage in highly complex simulations.

When following a scenario, participants usually look at the proposed problems and solutions through the perspective of their real-life roles, values, and experiences (van der Heijden 1996). This becomes problematic when abstract concepts and terms are used and when participants are engaged mostly verbally producing written narratives, as if often the case in many scenario development processes. This is why gaming techniques should be implemented, as they stimulate a broader range of ideas and emotions in participants, and consequently make the activity more effective. These techniques include using physical representations of reality such as maps, boards, and special cards, as well as representing institutional and organizational roles by assigning them to participants. Such role-playing can also stimulate users'' imagination by immersing them deeper in the simulated reality. Policy simulations are flexible enough to accommodate a variety of tools and techniques (Toth 1988) that can make them more visually appealing and interactive. As a result, they become more accessible and foster the development of more concrete, robust, and policy-relevant pathways.

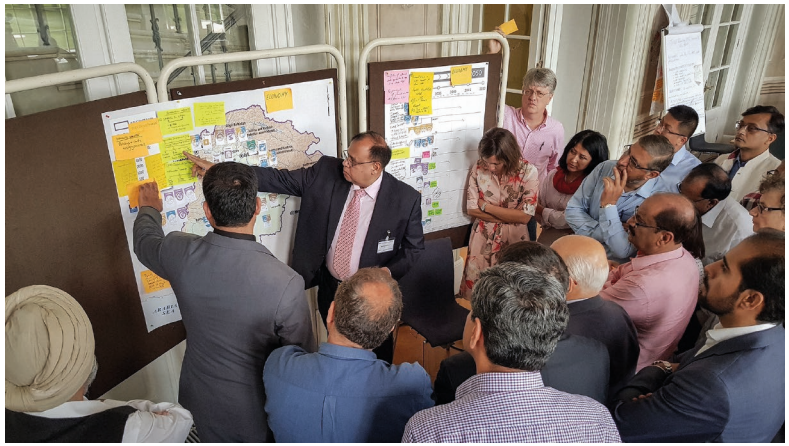
Policy simulations can be integrated with several systems mapping methods such as Concept Maps, Causal Maps, or Institutional Mapping, or. These methods usually operate at higher levels of abstraction - therefore, they should not replace, but rather complement concrete representations in policy simulations.

When to use policy simulations?

Policy simulations are well suited to make complexity manageable and understandable. They are used to tackle challenges involving many moving parts and fields of expertise. Policy simulations are used in any situation requiring when communities need to plan for the future in a collective effort such as implementation of the SDGs or for climate change adaptation. The method allows to bring people of diverse backgrounds and experience levels together to work on a common challenge. As described above, the strength of the approach is getting stakeholders together and combining their shared knowledge, experience and expertise to develop a shared understanding of challenges.

A Policy simulation is an innovative process used to develop creative strategic thinking and decision making capabilities. They are used in a variety of complex topics and generate positive results that enhance understanding and be used for future planning.

Policy simulations have been used as part of projects focusing on different topics. One example is the Indus River Basin Simulation.



Policy Simulation workshop on the Indus River Basin

Policy Simulation workshop on the Indus River Basin

The Indus River Basin Simulation is part of the Integrated Solutions for Water, Energy, and Land (ISWEL) project led by the International Institute for Applied Systems Analysis (IIASA) in partnership with United Nations Industrial Development Organization (UNIDO) and the Global Environment Facility (GEF). The overall aim of the workshop was to invite together Indian and Pakistan stakeholders in order to identify challenges and opportunities for cross-sectoral and transboundary cooperation in the areas of water, energy, and land in the Indus Basin.

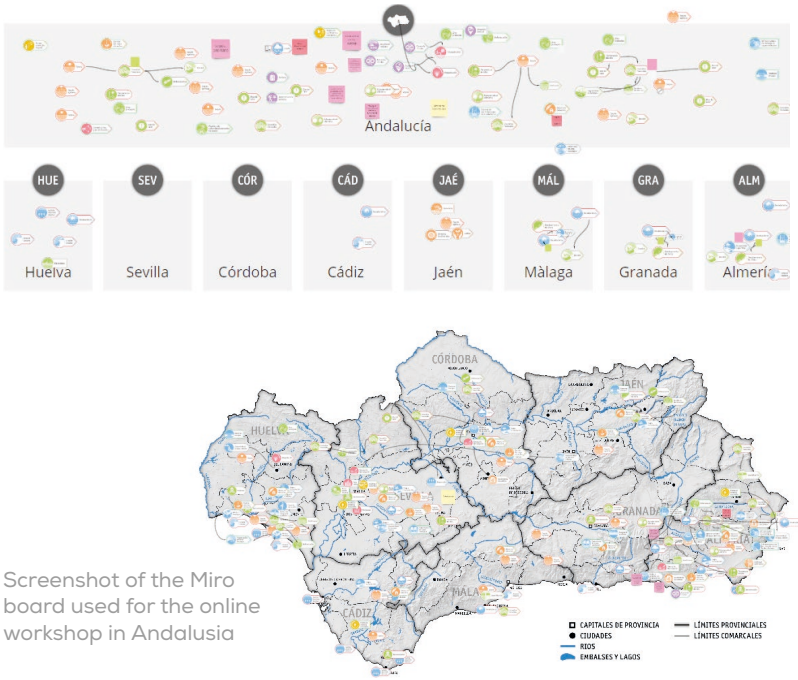
The workshop took place in an onsite setting. The process started with characterizing the current situation of a basin, represented in a simplified visual format. To this end, a predefined set of materials such as maps and cards with descriptions of infrastructure, economic activities and resources used were provided to facilitate discussions. The large map was used during the workshop to represent key elements of the real-world situation.

Based on joint assessment of the current situation, participants developed a "business-as-usual" pathway

In the next step, participants were divided into mixed groups including a person from each riparian country as well as a person representing each of the nexus elements. They developed three visions of "desired futures" together with their corresponding pathways. The pathway was then added to the indicated timeline of specific initiatives and investments.

The visions and pathways developed by each group were presented to other groups to exchange the reflections and suggestions for improvements. Afterwards participants continued working in the mixed groups from the previous steps further improving their visions and pathways to make them more realistic and robust.

Policy Simulation workshop on the Zambezi River Basin



Screenshot of the Miro board used for the online workshop in Andalusia

The Zambezi Basin Simulation was conducted as part of the Integrated Solutions for Water, Energy, and Land (ISWEL) project. The main goal of the policy exercise workshop was to co-develop different visions and pathways to desirable futures for the Zambezi basin taking into account different global developments and climate scenarios. The other aim of the workshop was to enhance the shared understanding of the implications of different investments in the basin and their consequences cascading through the WEL sectors. The scenario development workshop utilized extensively the policy simulation process. It started from reviewing the current situation in the basin and its key challenges and opportunities followed by specifying the "business as usual" scenario. Based on this understanding participants set basin goals and future visions (for desirable futures in 2050). This was combined with development and selection of nexus solutions, utilizing identified synergies. Finally, challenges and tradeoffs were identified with strategies to overcome them, contributing to inspiring and realistic future pathways for the Zambezi basin.

This systems mapping exercise with elements of policy simulation was developed as a core activity of sectoral workshops in Andalusia with stakeholders in the context of the EIT Climate-KIC Deep Demonstration project "Forging Resilience Regions", which aims to support European regions in their transformation to a net-zero emissions, climate-resilient, future.

The main objective of the tool was to identify challenges, impacts and vulnerabilities as well as presenting resilient elements and solutions throughout the Andalusian provinces. In order to work with complex systems and processes through visual mapping in an online setting Miro (an online whiteboard) was used.

The systems mapping exercise focused on Andalusia, where the region and its residents face important development and environmental challenges due to climate change. Our methodology allowed participants to spatially map the key elements of the existing situation followed up by representations of causal chains and feedback found within the system.

Based on Mintzberg and Wesley 2001

"Thinking first"
features the qualities of

science
planning, programming
the verbal
facts

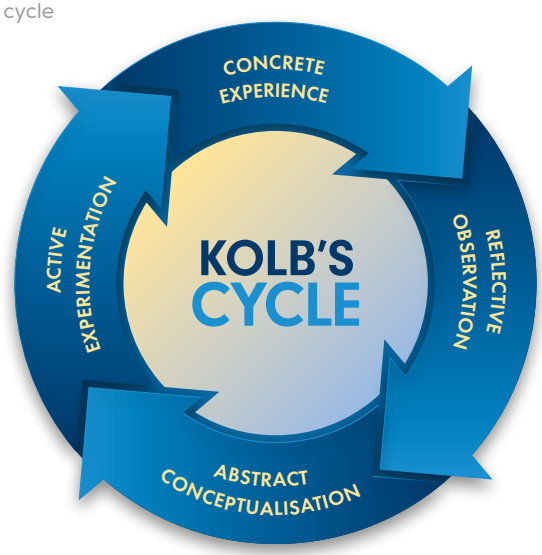
"Seeing first"
features the qualities of

art
visioning, imagining
the visual
ideas

"Doing first"
features the qualities of

craft
venturing, learning
the visceral
experiences

Kolb's cycle



Comparison with other methods of stakeholder engagement

As outlined above, a policy simulation offers the opportunity to collaboratively test ideas and work out challenges in a safe environment. Through experimentation and collaboration, novel ideas and solutions can emerge from interactions between stakeholders.

There are many different methods that can be used for workshops focusing on knowledge transfer and collaboration, and each has different advantages and drawbacks. We will not go over all these methods but will describe several aspects of policy simulations that greatly enhance engagement, improve communication, and foster creativity but are missing in other approaches. This particular suitability to engage stems from the fact that policy simulations use a more holistic approach to decision making.

Traditionally, decision making was thought to consist mainly in intellectual effort, or thinking, which draws on science, planning, facts, and verbal capacities. However, according to Henry Mintzberg and Frances Westley (2001), there are at least two other modes that can be employed. One is seeing, which involves art, visioning, imagining, and the visual representation of ideas. The other is doing, which makes use of craft, learning through experience, venturing, and the visceral.

This claim can be further supported by the evidence from educational research formulated via the theory of experiential learning by David Kolb, and further elaborated and tested by extensive studies. Experiential learning theory (Kolb 2014) posits that the process of learning (understood broadly as the totality of human experience) should include and balance: abstract conceptualization (the mode of thinking), reflective observation (the mode of seeing), as well as active experimentation and concrete experience (the mode of doing).

None of the elements of decision making or learning are mutually exclusive. In fact, it is desirable to create a process that involves them all.

There is a clear need for the process that combines experiential with reflective, and concrete with conceptual approaches; one that is problem-oriented and encourages thinking in terms of systems; one that emphasizes communication and collaboration; and naturally, one that, similarly to decision-making itself, is oriented toward the future.

Policy simulations were designed to combine these qualities. The purpose of policy simulations, is not to guide toward any specific solution, but to provide opportunity for learning and knowledge sharing. Policy simulations are not meant as instruction manuals on how to get from point A to point B. Rather, they assume a broader understanding of decision making as a learning process including both scientific knowledge, political realities, and local, often tacit knowledge kept alive in communities. The outcomes of this learning process spread across different groups and organizations.
So many stakeholders experienced the process that makes it hard for them to fully engage. So many meetings take the form of a plenary discussion. This leads to very limited time for speaking especially for less powerful participants. The verbal mode (missing visuals) makes the content difficult to understand. Ideas are formulated conceptually often without concrete examples. Reflection is limited without active forms of engagement (doing).

A popular form of stakeholder workshops are facilitated exchanges using post-its and other visual aids, where participants are often divided into breakout rooms to provide better opportunities for everyone to contribute. Although this is a substantial improvement over the plenary sessions such workshops still underutilize 'seeing' and 'doing' since the participants often fill in the post-its with popular buzzwords, sharing abstract ideas without concrete details and steps. Policy simulations use systems mapping that encourages participants to translate their general ideas into concrete representations (e.g. instead of 'integrated water resource management' they need to add specific infrastructures, technologies, and policies that are linked to specific locations).

Scenario development workshops, while being enormously useful for introducing future-orientation, share the weakness, with other methods described above, of overemphasizing the 'thinking', verbal mode. Visual (systems mapping) and experiential (role-playing) activities embedded in policy simulations improve the scenario methodology making it more accessible and engaging, leading to richer and more useful outcomes.

There are however some things to consider before designing policy simulations. Their ability to make complex topics understandable and accessible by stakeholders means that a lot of research and work is needed throughout the development process. Developing a policy simulation is an iterative process involving multiple versions and testing to ensure the topic is framed in a way to engage all potential stakeholders and ensure their inputs will be relevant. Policy simulations also require professional facilitation to coordinate the activities and make sure stakeholders are fully engaged and active.

Face-to-face Policy Simulation vs Online

Policy simulation can be applied in on-site workshops, encouraging face-to--face cooperation on complex issues, or online, enabling players to experience the successful simulation remotely.

Depending on the preferences or external conditions (e.g. COVID-19 pandemic), you can decide whether to bring the participants together in one room to conduct the workshop or run the simulation fully online.

Giving diverse stakeholders the opportunity to play in the same room engages them deeply in the simulation. The online format makes it more difficult to keep stakeholders engaged and active as opposed to face-to-face interaction where a facilitator can quickly assess the level of engagement and provide additional support. Some technical knowledge is required to use and navigate the online tools, and specific activities to teach participants on how to use them is necessary.

Despite the many advantages, running an online workshop differs from the face-to-face set up and involves other challenges that both moderators and participants will have to face. Restrictions caused by COVID-19 presented new challenges to policy simulation developers and facilitators, both in design and delivery of workshop activities.

It remains clear that online workshop setting has a great potential and comes with many advantages - i.e. participants in different locations are available remotely, which allows connecting diverse groups sometimes often difficult to reach in real-life setting. In addition, online activities can be easily integrated into already existing learning scenarios and support the deeper experimentation with real-life strategies. As this is likely to be a long-term shift from COVID-19, it is important to have the lesson learnt from the virtual workshops carried out and keep adapting online tools to audience groups and workshop topics and to respond to new, emerging challenges.

Take into consideration that for some participants collaboration online will be more difficult than face-to-face interaction, however, both types of simulation have certain strengths and weaknesses. Both, online and face-to-face workshops provide an environment for networking and sharing of experiences during and after the event.

Face-to-face ISWEL workshop

DESIGNING A POLICY SIMULATION

Defining system boundaries and framing the problems

As described in Section II. background, policy simulations are an effective tool for garnering stakeholder engagement, creating a common understanding of challenges we face, and enabling strategic future planning. The policy simulation methodology is well suited for a number of situations and topics, and is highly adaptable to fit your needs whether it be planning for climate change adaptation projects in a region or mapping out an energy transition process.

To design a policy simulation, you first need to frame the system you will be working with. This system can be a country, a region or any geographical area. Once the boundaries of the system are established, you can move on to the objectives and aims of the project and workshop . It is important to understand what is to be achieved by hosting a workshop and what the results will be used for. A policy simulation workshop is part of a larger process, not a means to an end. It is a tool used to collect data, share knowledge and connect stakeholders.

Since policy simulations for sustainability pathway development create collaborative visions for the future, it is important that those visions are based on scientific facts and built upon existing and accepted global development and climate scenarios. These scenarios should be shared with stakeholders during the introduction so that they can agree and understand the context of the future they are mapping during the workshop.

Choosing participants and identifying stakeholders

After deciding the overall topic and aim of the Policy Simulation, the next key step is to consider what kind of stakeholders the simulation workshop should be addressed to. Even though stakeholders are often already identified at the start of a project, there still might be a need to further frame who needs to be involved. Online Policy Simulations allow bringing together stakeholders from different backgrounds and locations so that they can jointly discuss, share information and collaborate by modifying a visual representation of their region, city or any other predefined system of their interest.

A Policy Simulation's goal should determine its design and participants. The designers should have a clear idea of what is needed and expected from stakeholders. On this basis, they decide whether a mixed group of participants or a specific type of background and expertise should be involved.

Stakeholder mapping / snow-balling method

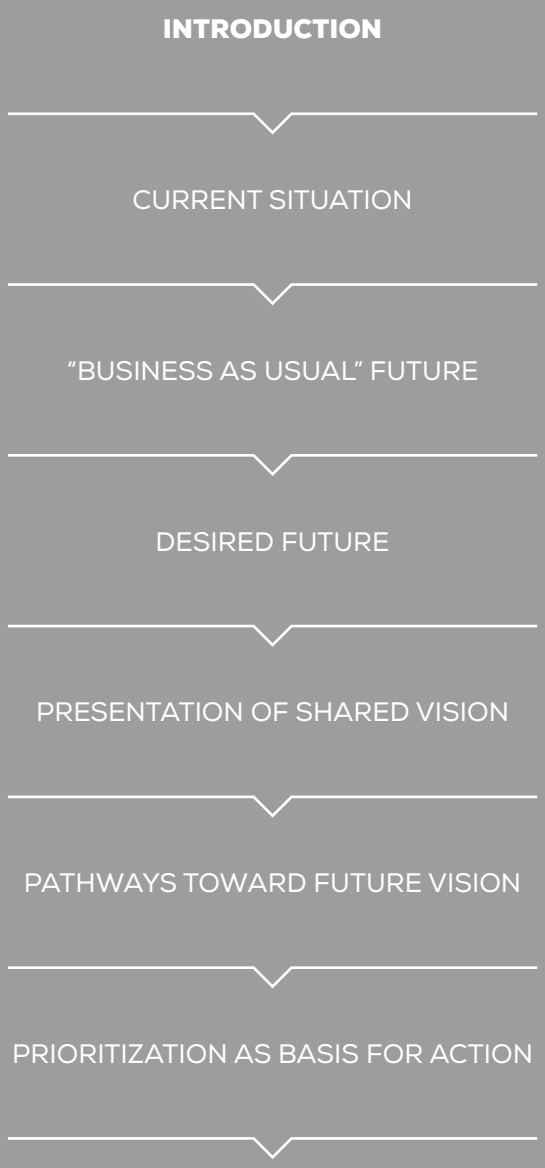
As explained by Varvasovszky and Brugha (2000) "stakeholders can be defined as actors who have an interest in the issue under consideration, who are affected by the issue, or who - because of their position - have or could have an active or passive influence on the decision-making and implementation processes". One of the commonly used methods in stakeholder analysis is the 'snowball technique', in which you start with identifying a few stakeholders at the beginning of the process and ask them to recognize new ones (either in terms of single individuals or entire categories of stakeholders). This method is usually supported by other methods and tools for stakeholder mapping. After initial stakeholders are defined, through brainstorming, preliminar identification or by researchers, they are asked to identify new stakeholders by providing names, their organizations, institutions etc. It is often carried out in the form of interviews - face-to-face interviews with checklists, semi-structured interviews or structured interviews with questionnaires (Varvasovszky and Brugha, 2000). Remember that in this technique, actors will be usually selected at the end of the process. It is recommended to engage a wide range of stakeholders, also non-expert and marginalised ones, without narrowing down the list (Leventon et al., 2016). The findings can be presented in different forms - matrices, charts, position maps, network maps, and other figures for presenting data (Varvasovszky and Brugha, 2000).

Reflect on a number and diversity of participants appropriate for achieving the workshop's objectives. We recommend not to have too few participants as this will limit the level of detail and knowledge sharing during the policy simulation. As for large workshops, even though they can cause facilitation issues, it can be worked around by using breakout groups, increasing the number of facilitators, or even by doing multiple workshops with smaller groups. Having too few participants or facilitators may limit the intended stakeholders' engagement and input, create wrong group dynamics or lead to incomplete outputs. Ensuring full participation in the simulation is crucial for a successful workshop. At the same time, this is one of the biggest challenges of activities conducted online.

Workshop process

Once the policy simulation approach has been defined and adapted to your specific project's aims and objectives and stakeholder profiles have been determined, it is time to go through the different elements that make up the policy simulation workshop.

In this section we will go over the different exercises making up the policy simulation and go over why and how to use them.



STEP 1: INTRODUCTION

The first step of any workshop is introducing the objectives and expected outcomes of the workshop to participants. At this stage, the agenda should also be shared to let participants know what will happen and what they will be asked to do.

It is important to present the aim of the project the workshop is linked to and what is expected of each stakeholder. Participants should also understand what their input and the workshop results will be used for and what next steps are already planned for the project.

With the increasing pressure to engage stakeholders in research projects, resulting in multiple workshops, we can observe a 'stakeholder fatigue', making them reluctant to participate in yet another workshop. This affects some topics and regions more than others, but it is understandable that one might be tired of participating in multiple workshops over the years and fail to see any results or follow-ups.

During this step, ask participants to quickly introduce themselves and answer an open ended question, such as *What are your expectations for this workshop?* or *What are you hoping to learn today?*

This step is useful to characterize the participants and for facilitators to prepare potential break out groups for future steps.

During online workshops, instructions on how to use the tools and practice exercises should be carried out at this time. (See the section: Running online policy simulations for more information on those exercises).

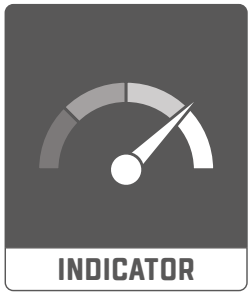
STEP 2: CURRENT SITUATION

System mapping is a central part of the policy simulation for sustainability pathway development. The process of stakeholder-led pathway development starts with characterizing the current situation of the system of focus of the workshop. This is done by representing the different important elements found in a region or city or by highlighting the current vulnerabilities found within a system. The system mapping approach presented here utilizes a simplified visual format made up of a predefined set of indicators used to create a visual and engaging representation of the system. Geographical maps are used as the base, while cards representing system elements create a representation of the system.

The system mapping activity is a process during which stakeholders identify and spatially point out system elements on a map of a given system. System elements can be divided into three main groups:

Entities are the physical, geographical or man-made elements that can be found in the system. Entities are agricultural areas, lakes, glaciers, hospitals, roads.

Processes represent changes happening in the system such as rainfall, tourism or migration. These processes can be naturally recurring, like rainfall and snowmelt, or be influenced by outside forces such as tourism, cooperation or migration.



Indicators are measurements that demonstrate changes happening in the system, e.g. in pollution, energy demand, health risk, water quality, or educational achievement. They can be both physical or abstract, precisely measurable or based on assumptions.

A system map is a visual representation of a given system that demonstrates its components and boundaries, as well as the components of the surrounding environment at a point in time.

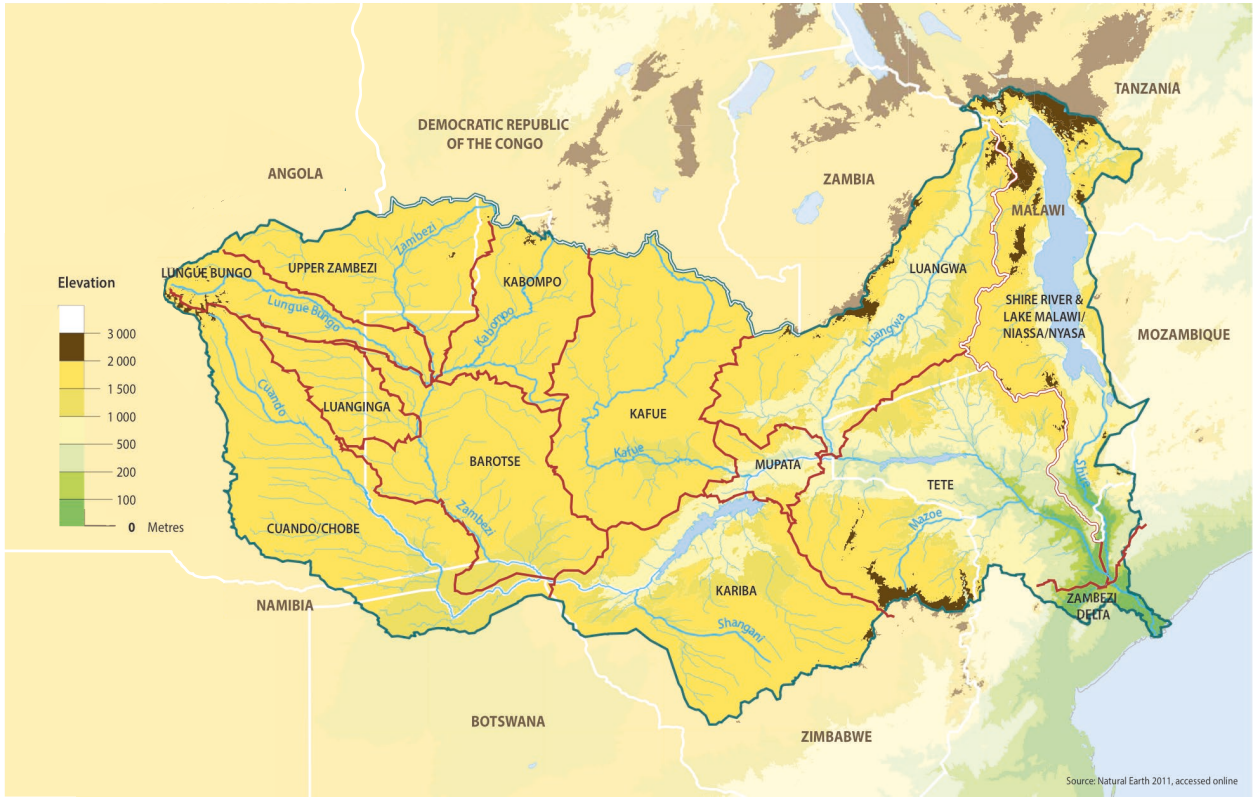
The main use of a system map is to represent the system structurally and to communicate the results to others. It enables to clearly express thoughts for analysis; decide on structural elements; experiment with boundaries; adjust the level of interest; and communicate to others the basic structure of the system.

During the policy simulation, participants will use visual elements to voice their concerns and express their knowledge and ideas. Here are the main elements they will interact with:

Map - Due to the geographical aspect of the systems mapping approach, maps are used to represent the area of focus of the workshop in a simplified visual format. They can include information such as borders, cities, rivers, lakes, land use, topographical information. Below are some examples of maps created for workshops:

Fragment of the map representing the Andalusian region in Spain, with province borders, main cities, waterways and topographical information.

Indus River Basin map which was printed and used during the workshop. The map includes the border of the river basin, rivers, region names and elevation levels.



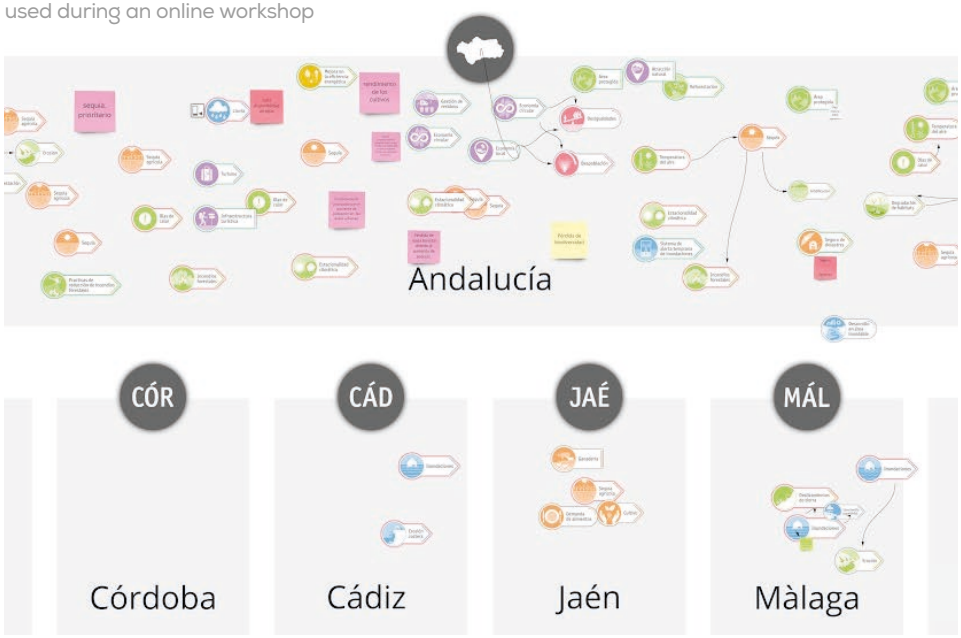
Zambezi River Basin map which was printed and used during the workshop. It includes the basin boundaries, regional borders, elevation and lakes and rivers.

Map: Spatially Aggregated Units - Elements are placed on a map according to a spatial connection, but some elements can span over large spatial areas; in such cases, placing the same card multiple times over the map could be misleading, i.e. for heatwaves or droughts. To accommodate such wide-ranging elements, 'Spatially Aggregated Units' are added alongside the map to place cards into. The cards placed there represent elements that extend in influence over large spatial areas. These Spatially Aggregated Units can represent regions of a country, cities, national parks, and other areas of focus.

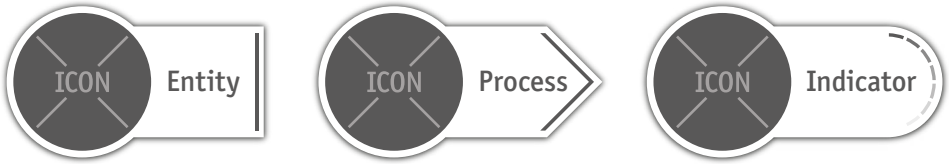
Cards - To use alongside the map, a series of predefined cards are designed. The cards are a way for participants to map the existing and projected elements and changes within the system they are analyzing. The placement and causal connections between those cards is at the basis of the system mapping exercise. Providing a set of cards that allows to create a complete representation of the system is crucial, but too many cards increase the complexity of the exercise and limit stakeholder engagement.

The cards are prepared differently depending on whether they are to be used in online or face to face workshops.

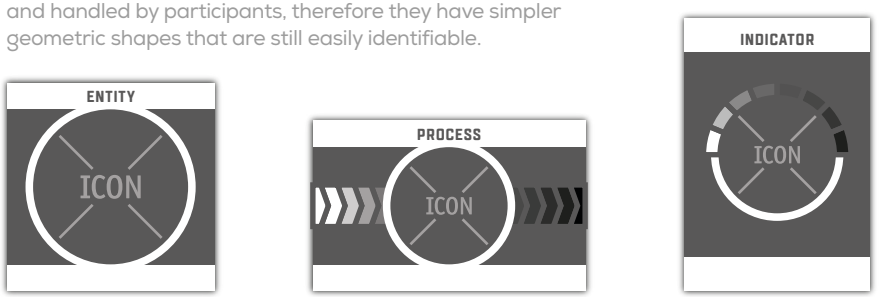
Examples of 'Spatially Aggregated Units' used during an online workshop



Online cards have a label type shape with a large icon and name tag on the right side that ends in a specific way to represent their type.



Printed cards need to be prepared and cut before the workshop and handled by participants, therefore they have simpler geometric shapes that are still easily identifiable.



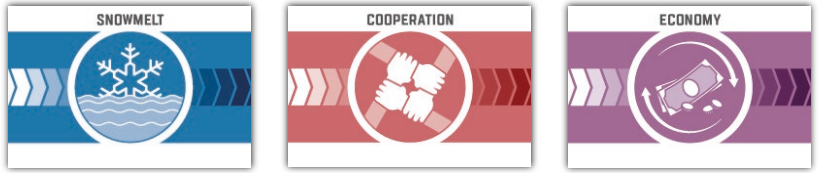
The cards are first divided into three thematic categories (entity, process and indicator) according to what they represent in the system. The shape of the card depends on the type of element the card represents and whether it is to be used in face to face or online workshops:

Entities are represented online by a card with a rectangular shape:

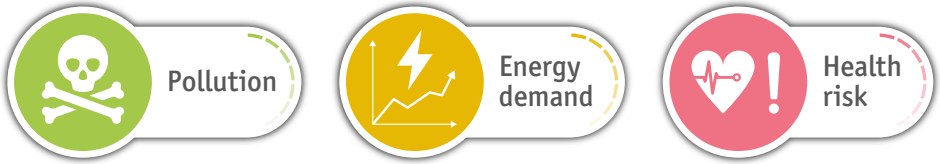
When printed, they have the form of a square:

Processes are represented online by cards in the shape of an arrow:

When printed, they have the horizontal, rectangular form:



Indicators are represented online by cards with a rounded edge:



When printed, they have the vertical (portrait) rectangular form:

The use of entity, process and indicator cards coupled with their different shapes helps to differentiate between the cards placed on the map when creating causal connections. It is also useful for the analysis of the workshop results.

The color of the card corresponds to its thematic area (i.e. green for environment, blue for water, purple for economy). Each card has a custom icon along with its name to make them easily identifiable and create a visual connection between all the provided material.

Cards were chosen to provide sufficient information without narrowing down participants' scope of exploration and breadth of choices. It is also encouraged to use post-it notes to add elements that might not be included in the card selection.

The categories of cards presented in this guidebook are a selection of the ones used during past workshops. Depending on the focus of the workshop, different card categories can be introduced to represent the needs of the workshop.

Attribute tags - A series of attributes and trend tags are provided to add detail or meaning to a card, or link it to a specific location. The attributes and trend tags increase the meaning and knowledge value in each card by adding information about its importance, general trend, state in the system, or location. Those tags come in the form of a small icon which can be added next to a card.

Different attribute tags were created to represent the potential states and trends of system elements. These tags can add a lot of information to an existing card, but also can change its meaning so it comes closer to what the stakeholders intend. Certain cards can lack nuance without the use of attributes.

Trend tags can also be combined with state tags to further increase the information provided by each card. In the case below we can see that high air temperature events are increasing, while low levels of rainfall are decreasing even further.

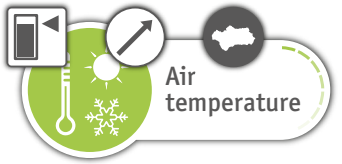
As stated earlier, the cards are placed on the map to be geographically attached to a specific area, however some cards can represent elements that affect larger areas than can be covered by a single card. Instead of placing a multitude of duplicate cards, localization tags were introduced that can be combined with the 'Spatially Aggregated Units' presented in the Map - Area boxes section above. The tags can be adapted to the area of focus of the exercise. In the case below, the first 8 cards represent the provinces of Andalusia, while the last one represents the whole of Andalusia.

Trend and state attribute tags were created to increase the information that each card can provide.

Examples of different meanings of cards with state tags. The cards on the top row indicate low air temperatures, low water demand and low cooling demand, while the cards on the bottom row indicate high air temperature, high water demand and high cooling demand.

Multiple tags can be added to increase the level of detail of the cards.

Localization tags are used to signify the card affects a larger geographical area. These were used to represent the different regions of Andalucia.



High air temperature is further rising in the Andalusian region.

Coastal erosion is increasing in the province of Malaga.

The materials concerning thematic areas should be chosen to provide sufficient information without narrowing participants' scope of exploration and breadth of choices. Participants should mainly use the cards provided, but they can also use post-it notes to add information that they feel might be missing from the cards.

This activity can be done in a plenary session or in breakout groups depending on the number of participants and the focus of the workshop.

When dividing participants into smaller groups, it is important to consider their composition. Dividing participants in sectoral groups based on their expertise can be used to get specific information about a geographic or thematic area. On the other hand, using mixed groups will lead to a holistic view of the system, which can lead to further knowledge sharing. Both have advantages and drawbacks, but the decisions should be taken prior to the workshop.

STEP 3: "BUSINESS AS USUAL" FUTURE

Based on the assessment of the current situation made during the previous steps, participants develop a "business-as-usual" vision of the future - i.e. a series of changes of the existing situation that is likely to happen if current policies will continue. The change is represented visually with markers such as "increase", "decrease", or by adding elements on the map. This step creates a baseline vision for the future that will happen unless action is taken to change the situation. "Business as usual" is an important step, as it gives participants an overview of unwanted consequences of inaction.

This step uses the same visual elements (map, cards and attributes) as the previous step to develop a "business-as-usual" vision of the future.

STEP 4: DESIRED FUTURE

After developing a common understanding of the current situation with participants and having them create a "business-as-usual" future, it is time to start working on an alternative future vision and pathways leading to them. Unlike the process of characterizing the current situation, which concerned the current state, existing policies, and directions of their system, the process of developing future pathways starts from a clear, simultaneously ambitious and realistic, vision of what can be achieved. Developing and mapping a shared future vision is an innovative process involving creative strategic thinking and decision making. The future vision is developed on a new empty map, set to represent the region in a future date whose selection depends on the workshop's focus. It works in a similar way as the visioning exercise described above, but this time participants are invited to interact directly on the map and place elements on their geographical location. The same cards as in the previous steps are to be used on a new map.

This activity can be done as a plenary session or in breakout rooms depending on several factors:

The size of the group. Whether in face to face or online workshops, it is better not to have too many participants working on the same map. This will ensure that the process is a collaborative effort made through discussion and sharing of ideas.

Expected insights. If you want each vision to have a specific focus, assign participants to groups according to their specific expertise. This way, they can work in parallel on visions specific to the environment & water, economy and energy for example.

Sensitivity of the topic. If the topic is sensitive or controversial, it could lead participants to object or block proposals for the vision. Topics such as energy transition in some regions can be quite political and could lead to some sort of objections by certain participants.

Developing a system mapping view of a common future vision enables participants to collaboratively represent what their region could look like in the near future. This process is used to create a compelling vision, as well as to help decide on how to achieve it and to inspire to action. This process can involve participants of any experience level as it uses creative thinking to generate visions that can range from highly creative to being detailed and very structured. This method can work for short, medium and long term visions.

During this step each group works independently on a map and uses cards to create their future vision.

STEP 5: PRESENTATION OF SHARED VISION

At this stage, different visions of the desired future will have been developed by the groups created in the workshop. Each group should present and explain their future vision in a plenary session with time for a discussion. This allows participants to develop a shared understanding of what others see as desired futures.

Policy Simulation workshop on the Zambezi River Basin

Each group should assign a representative that will explain their vision using the map they have developed. The presentation should be relatively short with room for discussion between all the participants.

STEP 6: PATHWAYS TOWARD FUTURE VISION

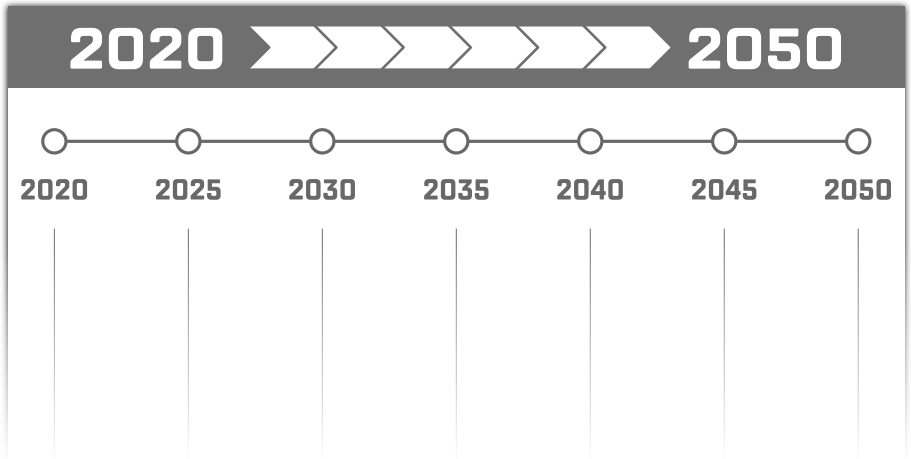
After developing a future vision spatially on a map, pathways leading up to that future vision should be developed. In a collaborative effort, the many steps towards that future vision are discussed and placed on a timeline, which highlights the strategies, milestones, and decisions needed. Pathways can be developed in different ways and with different approaches, such as backcasting. Backcasting is a planning method that starts with defining a desirable future and then proceeding backwards from that future to the present in order to strategize and plan how it could be achieved (Vergragt and Quist. 2011).

After sharing and discussing the different group visions that were developed leading to a shared common vision for the future, the main system elements (entities, processes, and indicators) should be arranged into a timeline to create pathways toward the shared future vision.

Participants first place major elements on a timeline template, indicating the desired time when each should be completed. From there, other, minor elements are laid out in between the major ones to map out the process of finalizing the vision.

Timeline template

Using a timeline template participants use provided cards and post-it notes to create a pathway towards the future vision. The timeline should be filled using a backcasting approach to focus more of the path towards the goals than the goals themselves.



It should be remembered that this approach is about visioning, not forecasting. This is the start of a conversation about a future vision and the pathway should not be considered a hundred percent accurate. It should be realistic without being limited by lack of expert knowledge or uncertainty.

STEP 7: PRIORITIZATION AS BASIS FOR ACTION

After the timeline is filled, a prioritization of both the map and timeline elements should be done. This will highlight what participants feel are the key areas of action to focus on in order to reach the future vision and to take the discussion further.

The aim of the prioritization exercise is to highlight the most important elements that have been placed by the participants on the map and the timeline. It is achieved by way of voting. Each participant has a number of votes to use in the form of pre-prepared dots. You can decide on the number of votes per participant based on the number of attendees and the variety of elements to be voted on. Ask participants to vote on the most important aspects on the map and the timeline. They should do it by copying and placing the dots next to the cards located on the map and timeline.

The next step is to enable attendees to rate their level of support for each priority on a scale. Gradients of Agreement (see below) is one of the methods that can be used for this purpose in order to move the discussion forward and reach the future vision. It is important to highlight that the aim of the tool is to stimulate the discussion and see where people are on the topic. It doesn't determine winners or losers.

Gradients of agreement

Whole-hearted Endorsement	*I really like it.*
Agreement with a Minor Point of Contention	*Not perfect, but it's good enough.*
Support with Reservations	*I can live with it.*
Abstain	*This issue does not affect me.*
More Discussion Needed	*I don't understand the issues well enough yet.*
Don't Like But Will Support	*It's not great, but I don't want to hold up the group.*
Serious Disagreement	*I am not on board with this – don't count on me.*
Veto	*I block this proposal.*

This is the Gradients of Agreement Scale. It enables members of a group to express their support for a proposal in degrees, along a continuum. Using this tool, group members are no longer trapped into expressing support in terms of "yes" and "no". The Gradients of Agreement Scale was developed in 1987 by Sam Kaner, Duane Berger, and the staff of Community At Work. It has been translated into Spanish, French, Russian, Mandarin, Arabic and Swahili, and it has been used in organizations large and small throughout the world.

After the prioritization exercise, choose the elements with the highest number of votes. We recommend you to choose between 5 and 10 elements that will represent key areas for action. Poll each participant to determine his or her level of agreement with a given priority, putting a sticky note for each on the scale. Ask them to refrain from explanations until the discussion in the debriefing session. During the discussion, you can ask participants with the highest and lowest level of agreement how the key areas of action could be used in order to achieve the future vision.

STEP 8: DEBRIEFING

The debriefing is the time when we close the experiential learning cycle. Experiential learning requires us to experience a problem, reflect on its causes, brainstorm solutions and challenge them from different perspectives. Policy simulations lead participants from understanding of their current situation to imagining desirable futures, and in the process, they construct sustainability pathways that include different solutions. The process helps them to navigate complexity, understand the diversity of underlying values, and attempt to define a shared ground for the future they all want. All these steps may require a look back and an additional round of reflection about the process itself.

Were all the voices heard? Have women and minorities represented offered opportunities to express their concerns?

Are there some issues requiring more data? A more detailed analysis?

Were there any conflicts? What were the reasons? Is there something that can be done about them?

Were there any important topics that were ignored altogether?

The time for debriefing can vary but it is recommended to plan between 30 minutes to 1 hour on debriefing activities. During the session, also make sure that all the voices are being heard, including quiet participants. If you are short on time, reduce the time you spend summarizing what happened and let participants begin reflecting on their actions. Consider using breakout groups for the first of the session, if the whole group is large.

Results overview

In the first phase of the debriefing, take a few moments to summarize what happened during the simulation. You might want to go through all the steps and brief on the most important aspects found in each.

Evaluation

The last step of workshops is to distribute surveys. You can distribute the Simulation Survey, either as a hard copy (in a face-to-face workshop) or as a link (in an online workshop), to gather feedback on the simulation. You get better results when you distribute it in person, but participants may find an online survey easier to fill out and send back to us. These surveys will help you develop and/or improve the simulation better and understand what aspects are most informative and what could be conveyed better. As you close the workshop, you may decide to introduce some additional steps, but it is up to you.

OPTIONAL: ROLE PLAYING EXERCISES

One of the main challenges of workshops is to maintain active stakeholder attention and engagement. Active participation often becomes problematic when abstract concepts and terms are used and if participants mostly speak and write. Introducing policy simulation elements and gaming techniques to the systems mapping method provides participants with a flexible and customizable remote collaboration experience.

Why use role playing elements during workshops?

Policy simulations can be integrated with many other participatory methods, such as role-play, visual representations, and interactivity, bringing additional perspectives. Role-play can expand the participants' imagination through stronger immersion in the simulated reality. Visual representation and interactivity make the exercise more accessible and produce more concrete, robust, and policy-relevant pathways.

Moreover, role-playing games have also been successful in simulating how people address complex resource decisions such as sharing water for irrigation in Africa (Barreteau et al. 2001), farming and subsidies in North America (Taff 1998), and land use change around national parks in Poland (Krolikowska et al. 2007). Role-playing games are highly flexible and leave room for individuals to demonstrate their initiative and imagination (Ladousse, 1987), which is an advantage in games involving policy making.

After working on the current situation and getting a common understanding for all participants, a role playing activity can be used to shift participants' focus away from the current situation and towards a future vision.

Examples of role playing activities:

A **visioning exercise** is a simple, introductory exercise which can be used to foster creativity and imagination as a "warm-up" before developing more detailed maps of desired futures via policy simulation The duration of the visioning exercise can be adapted to the needs and constraints of the group. A vision generates a common goal, hope, and encouragement. It gives participants motivation to go further in their reflection, generating creative thinking and passion. A visioning exercise should create a vision that is optimistic, imaginative, yet realistic and tangible. The vision should be both rational and inspirational.
There are many approaches to visioning, we describe here one of the many methods, based on Sibet (2011).

How it works

Example instruction: *Imagine it is 2050. A successful energy transformation took place in your region and you read a newspaper describing it. What would it say?*

In smaller working groups, participants work on visual templates. The templates should be filled like a real newspaper - with headlines, quotes, text, and images. Groups should define tangible goals for the transformation. Actions should be defined along such themes as technology; assets; regulations; society.

A group working on a visioning exercise

After completing the templates, participants present their newspaper article and other groups give feedback.

FACE-TO-FACE POLICY SIMULATIONS WORKSHOPS

Preparation of materials and room setup

Conducting policy simulation workshops in a face-to-face setting requires the printing of material (maps and cards) and preparation of supporting equipment. When working on a policy simulation and its elements, keep in mind that most items should be designed for single-sided printing. Some of the elements on print-outs (e.g. cards) will need to be cut to size. You also need to collect other materials to lead the simulations, such as tokens (for prioritization exercise) and badges. After you have printed and collected all the necessary materials, you will need to organize them.

Below you can find a list of all elements. It provides specific information about what you need to run the simulation in a face-to-face setting (Table 1). In Table 2, you can also find the instruction that will help you get the required space to run a policy simulation workshop.

Before you go further in setting up the simulation, please take some time to read the other sections of the guidebook.

TABLE 1

Simulation Elements for Printing: Map Cards	This includes simulation elements to print. Ideally a map should be printed in a large format (it depends on the number of participants and the level of details that you want to reflect on the map). We recommend printing a map in a printing house. If using a home A4 printer, divide the map into sections and print one section per sheet. Laminating the map can be useful if you want to write directly on it. You can also prepare additional sheets around the map, e.g. showing particular regions or other areas.
Cut to size: Cards	Some of the materials will need to be cut to size.
Other materials: 1 type of tokens 1 small container Post-its (yellow, orange, green, violet) 3 flip charts with paper and pens (different colours) Bell	You also need to collect other materials to lead the simulation. Tokens will be used in the prioritization exercise. Put them in the container. As mentioned before we don't want to narrow down participants' scope of exploration and breadth of choices - they can write additional elements on post-its and place them on the map. Flipcharts with paper and pens will be used mainly for the magazine cover exercise - 1 set per each group.
Moderator materials Simulation scenario Room setup Facilitation FAQ Debriefing outline	And finally, you can print out moderator materials, including the scenario document and the debriefing outline.
Sort all other materials and put aside	

TABLE 2

Room Requirements	Keep the number of participants in mind when selecting a room. You will have quite a bit of furniture, which you will see in a moment, and they will need space to move.
Simulation area	One large table - minimum dimensions 1 meter 50 by 2 meters - is needed for the map.
2-3 tables	Ideally, you will have a couple of extra small tables or desks for group work.
Moderator table	An additional table is needed for moderator materials.
Chairs	You should have chairs available for participants, even though they will mostly be standing.
Projector screen **Laptop/Notebook**	A projector screen is optional, but may be used if you would like to display a presentation or video along with your introduction. Projectors are also necessary in the hybrid version of the simulation - if some participants are attending the workshop on site and some of them are joining online.

Workshop preparation and facilitation

The success of the workshop depends largely on your preparation. Once you went through all the steps of workshop design and preparation, facilitation is the last step in this process. Below you can find a few tips for the workshop preparation and facilitation.

1 Day before the workshop:

Set the meeting agenda, share it with your co-moderators (if that's the case) and send it to the participants 1 day before the workshop;

We recommend to confirm the list of the participants, room reservation and event's schedule (in case your session is a part of the larger event);

Send participants relevant practical information (address, contact details, times, etc.);

Prepare the materials you will need for the workshop (printouts of the agenda, script, list of the participants and contact details, laptop, brochures, flipchart pens, etc.).

Tips for workshop facilitation:

Prepare for your facilitated session (room setup, materials, script and others);
Set upon the tasks for each moderator/co-moderator;

Prepare yourself for being flexible in time and workshop flow. Be prepare for unexpected events such as time shifts e.g. if your workshop is part of a larger event;

Create your work environment with climate setting, clarify the aim of the workshop and the workshop flow;

Remember to take a break, even if very short, so that participants can drink water and stretch their legs;

If possible, you can take the notes during the workshop that you can use for the evaluation;

After the workshop remember to meet with your co-facilitators to evaluate the workshop (action review) as well as follow up the workshop participants with a survey.

Warm up exercise in Miro board

ONLINE POLICY SIMULATIONS WORKSHOPS

Successful online workshops require good design in terms of time, tools, and software, and preparation for possible challenges such as those related to the IT skills of the participants. The following points are described, which should be taken into account when designing online workshops.

Understand your stakeholders' needs

Once you have identified your stakeholders group, investigate what are their needs and expectations, computer literacy skills etc. It will enable you to develop and design the workshop structure that best meets the stakeholders' needs.

Fully remote workshop when both participants and facilitators remain online;

Hybrid (blended) workshop that is a combination of traditional face-to-face workshop with an online format. You can apply this way of simulation if some participants can gather on the spot in the workshop space, while some need to remain online. This requires special preparation by the designer, organisers, and trainers, especially in terms of IT equipment, room setup, group work, communication and collaboration.

We also recommend sending presentations, short instructions, and/or pre-recorded videos to the participants in advance so they can review them beforehand. This way, they can explore the tools that you will use during the session, so you will spend less time on teaching and explaining them during the workshop.

Moreover, in order to keep the right group dynamics, plan the simulation in a way that alternates between plenary sessions and in-group work.

Role of technical moderator - we recommend that during the workshop one of the moderators should get assigned the function of an assisting (technical) moderator that will help participants with technical issues and, for instance, transfer the opinions expressed in the Zoom chat (or other conference software) to the Miro board.

Before the workshop

Thorough preparation of the activities before the workshop improves the process and allows participants to become familiar with the planned forms of online activities. Below are steps that can be taken in the preparation of an online simulation workshop.

During the registration period

Make the timezone of the workshop very clear if people will be attending from different locations. Send a link with a timezone converter to help.

In case of role-playing activities - the roles can be given randomly, but you can ask people about the preferred one during the registration to the workshop. You can also create an online document where people can assign the roles themselves.

2 days before workshop

Update the browser you will be using

Send an invitation link to the meeting on teleconferencing software - participants may not call in!

1 day before workshop

Print out facilitation materials if needed

Send out emails to participants including:

login and password to Miro,

login to the teleconferencing software,

instructions for the teleconferencing software and Miro (PDFs, videos, etc.)

Time and breaks - Reflect on how to schedule the time for each activity and break in order to keep the active involvement of participants and make the workshop productive. To this end, we recommend splitting the simulation into shorter, manageable segments. We recommend that you plan the online workshop with the policy simulation for 2,5 - 3 hours, including introduction exercises, simulation process, and debriefing. Remember to schedule a longer break - 15 minutes or more, so people can move around, take something to drink to rehydrate. It is also important to give the participants space and time to chat and network with others.

It is also important to prepare backup plans in case of technical difficulties. The following challenges have been identified and faced in virtual design and delivery of the systems mapping exercise:

Insufficient technical skills by the participants - Considering that many of the participants will be unfamiliar with the tools used during the workshop (both Miro and Zoom or alternative ones), it is recommended to do some warming up exercises and introduce stakeholders to the basic functions of Miro. The function of an assisting moderator is also important, helping participants with technical issues and, for instance, transferring opinions expressed in the Zoom chat to the Miro board.

An additional difficulty is the diversity of the IT equipment used by participants (monitor resolution, computer performance), the speed and stability of Internet connection. This often causes additional stress and frustration for both moderators and participants.

Strengthening participants' active engagement and supporting them in the process - Moderator guiding the workshop process needs to monitor and maintain the group dynamics and active engagement, which is particularly difficult in an online environment. It is recommended to use video chats during the workshop, so the participants feel less isolated and can form an emotional connection. Tools used (Miro, Zoom) and the workshop methodology (ice-breakers, warm-up exercise, debriefing sessions) help to build trust among participants, as well as to drive interactions and engagement.

The inability to observe body language and make eye contact combined with relying only on verbal signals makes it more challenging to assess the participants' involvement and make adjustments to keep them motivated.

It is more challenging to maintain attention during virtual workshops than it is in a real-life setup. Participants get distracted more easily due to technical issues or external interruptions and noises. Moreover, participants' attention is challenged by engagement being less physically immersive and more emotionally disconnected than in the face-to-face interaction. As a result, the level of audience's attention in an online workshop is lower than in face-to-face workshops. Moreover, session times can vary significantly, depending on the type of content, level of interactive activities, and audience's appetite.

Using the online workshop software

We recommend using Miro and Zoom as the main online tools for the workshop due to their flexibility and relative ease of use. Computer literacy is always a challenge during online workshops and the ability to guide participants through the steps is crucial. Facilitators should be well versed in both tools, understand how to use them and practice with them.

The Card Dropper - it is a tool created by the Centre for Systems Solutions for the purposes of online workshops. It is not available in the original Miro version. An important part of the simulation is the ability for stakeholders to place the cards on the board. As simple as it is in person, the online format can make this action complicated, which can lead to stakeholders using fewer cards and decrease the quality of the information gathered during workshops. Consequently, in order to reduce the need to use different browser windows or have to navigate too much around the Miro board, the Card Dropper tool was added to simplify the action of putting cards directly on the map. The tool was programmed by the CRS team and is used to place cards directly on the map with the least amount of effort. Clicking the card dropper icon in the Miro toolbar opens a new panel which contains all the cards organized by themes and subthemes. A card can then be selected and copied directly onto the map.

The tool is managed by facilitators and can show cards in a predetermined order, for example to limit the total number of cards stakeholders have access to in each phase of the workshop. This is used to control the workshop's execution and to ensure that participants can focus on the right cards at the right time.

If you would like to use the Card Dropper in your simulation, please contact magnus@iiasa.ac.at for the technical details.

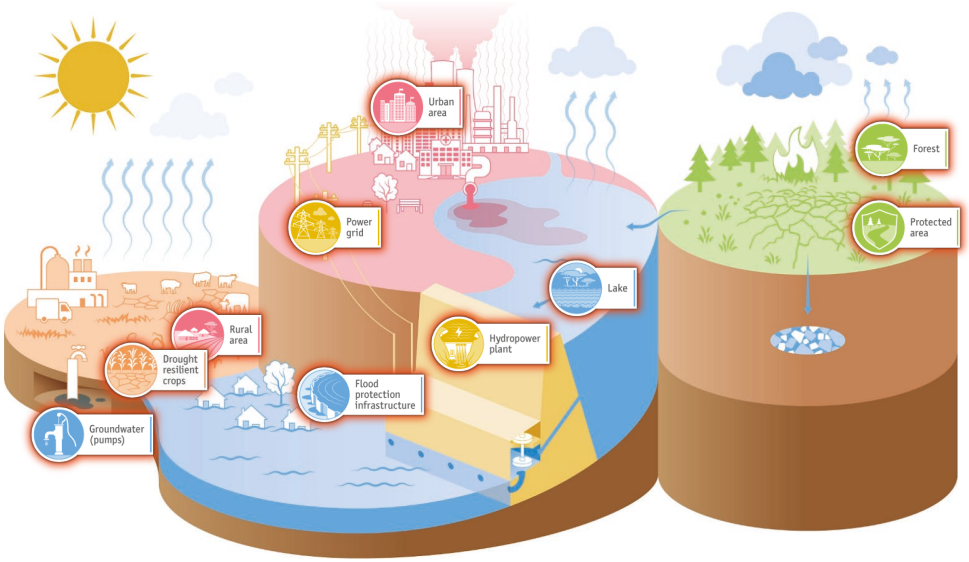
The card dropper is used to get quick access to all the provided cards

PDF **HOW TO USE MIRO**

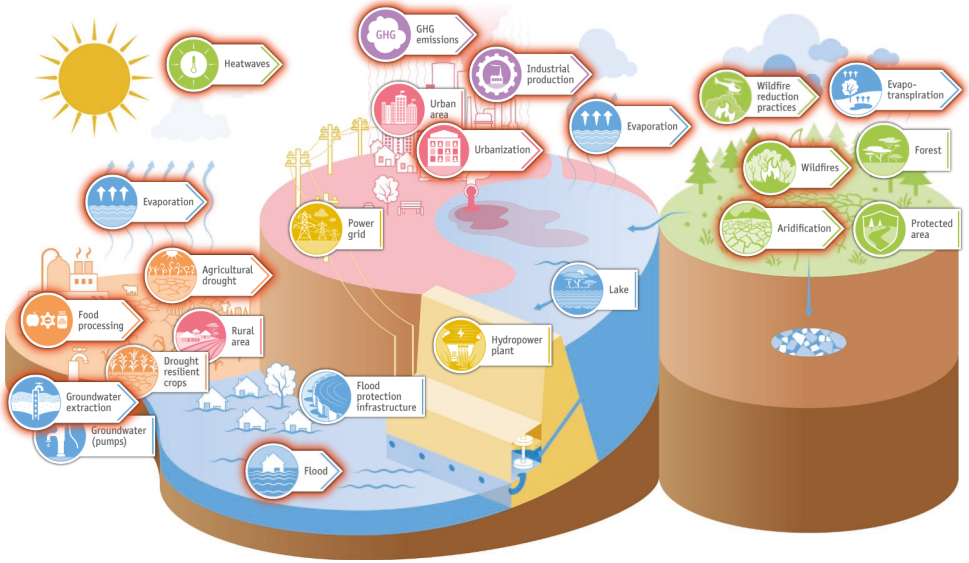
PDF **HOW TO USE ZOOM**

Warm up exercise based on the system graphic - The process of systems mapping starts with a warm up exercise to familiarize participants with Miro, the card dropper, and the materials (cards, maps) they will work with. Participants are introduced to a system graphic - a representation of parts of a system. The participants' task is to place cards on the system graphic using the card dropper. This warm up exercise is meant to help participants to get familiar with Miro and the card dropper, to see the available cards, learn how to use them, and to understand the actions they will need to take the system mapping.

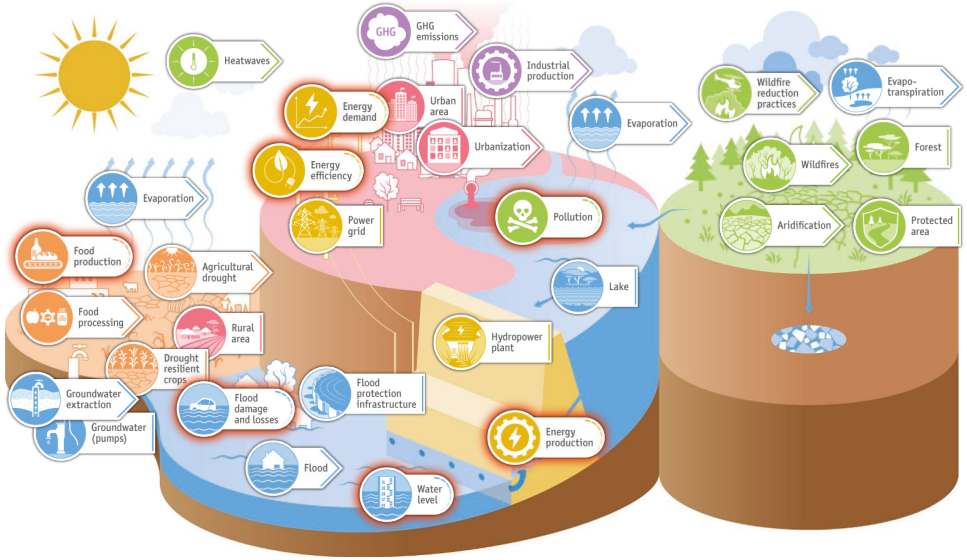
This graphic represents a complex system composed of different system elements - participants will use the cards to map it.



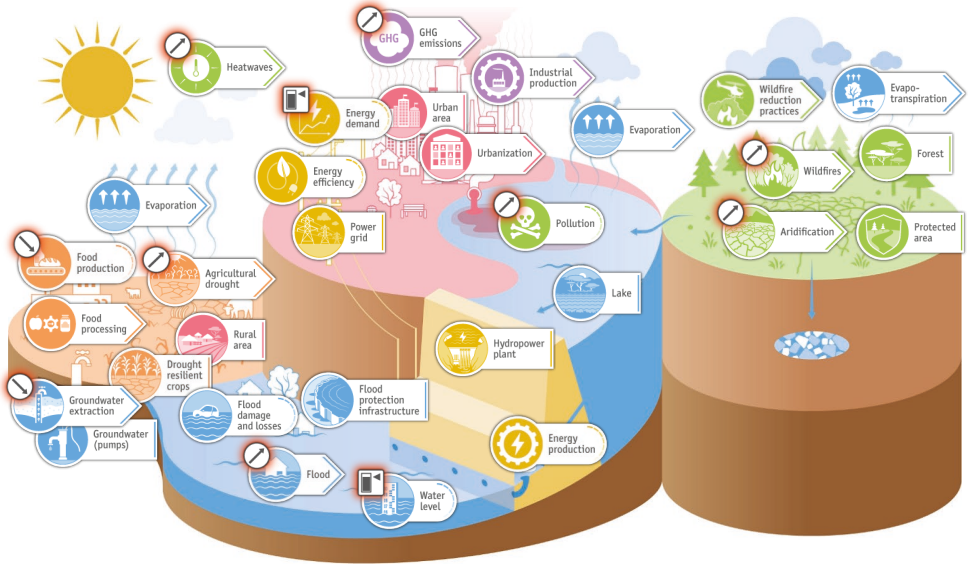
Step 1: placing **entity cards** on the graphic.



Step 2: next, participants place cards representing **processes**.



Step 3: then, they place cards representing **indicators**.



Step 4: The last step is to add attribute cards to add detail where they are relevant (some cards do not need attributes).

The steps for this activity can be adapted to different workshop objectives and introduce different elements that will be used later. The system representation can also be different to highlight specific issues.

Backup plan - We recommend using Miro and Zoom for your policy simulation workshops, both are stable and well supported, however it might be a good idea to think about backup solutions. There is always some uncertainty when using online tools due to maintenance or interruption of services. Having backup solutions available should that happen is always a good idea. Having an alternative meeting ready on Microsoft Teams or Webex and a backup of the Miro board in another online whiteboard tool such as Mural is good practice. Remember to check if the alternative tools meet the workshop's requirements - in terms of the length of the meeting, the maximum number of participants, signing up for free accounts. Additional instructions for alternative tools should also be at hand.

Software - You should use the teleconferencing software you are most comfortable with. Regardless of preparation, there are always a few participants who have problems with audio or video. Make sure you know the software enough to be able to quickly guide players through potential problems during the workshop. We also do not recommend accessing the simulation via phone. During the online simulation, participants will be invited to interact through 2 different types of online tools - Zoom for video conferencing and Miro for online collaboration.
Make sure that you have tested your teleconferencing software and that participants have received all the necessary materials (e.g. Zoom and Miro instructions) and Miro log-ins and codes ahead of time.

Materials needed:
1 computer (2 screens recommended), with teleconference software of your choosing

System requirements:
- An internet connection – broadband wired or wireless (3G or 4G/LTE)
- Speakers and a microphone – built-in or USB plug-in or wireless Bluetooth
- A webcam or HD webcam - built-in or USB plug-in
- Or, a HD cam or HD camcorder with video capture card

Supported browsers:
- Windows: IE 11+, Edge 12+, Firefox 27+, Chrome 30+
- Mac: Safari 7+, Firefox 27+, Chrome 30+
- Linux: Firefox 27+, Chrome 30+

Recommended software:
- Conference software: Zoom
- Any software that enables moderator to:
  - Share the screen
  - Divide participants into groups
  - Send messages to all participants at once
  - Send messages to individual participants

Nice to have:
- Sending files
- PowerPoint → for presentations

Running the workshop

Running online workshops is easier in some respects but more difficult in others. On one hand, you don't need to prepare a room, but on the other, it's much more difficult to manage people in an online environment and keep their attention high for a longer period of time.

We find it helpful to print out some of the online materials to make it easier to facilitate. You can also use digital documents - it's always better to save paper. If you have access to another monitor, you might want to use it too. With two or more screens, it will be easier to follow what's going on in the game via the teleconference software, and to go through the gameflow document at the same time.

[illustration with example of online setup - two monitors, one has moderator view and zoom window, the second has player view and document]

You might want to encourage participants to turn on their cameras - it will make the online interaction a more personal and friendly experience.

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