NAVIGATING COMPLEXITY THROUGH SOCIAL SIMULATIONS

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CENTRE FOR SYSTEMS SOLUTIONS SOCIAL SIMULATIONS THE WORLD'S FUTURE NEXUS GAME ENERGY TRANSITION GAME LORDS OF THE VALLEY GREEN&GREAT NEW SHORES ABOUT THAT FOREST FLOOD RESILIENCE GAME CULTURAL MEMORY GAME GIFTS OF CULTURE OUR ACTIVITIES OUR TEAM

Centre for Systems Solutions

We develop and apply groundbreaking methods and tools that support people, groups, organizations, and coalitions in making sense of complex problems and collaboratively developing creative and inclusive solutions. Using science-based evidence and listening to many voices, we aim to inspire positive change through participation, dialogue, and collaboration.

Urgent global challenges, such as climate change, shrinking natural resources or growing inequalities, require insight and collaboration at many different levels, from local to global. However, far too often, promising efforts fail due to misconceptions, lack of trust, or poor communication. There is a burning need to find effective and accessible ways to tackle complexity, uncertainty and ambiguity, and to trigger changes in attitudes, mindsets, and behaviors.

Many different methods and approaches have been proposed to address this need. However, most of them rely too strongly on expert opinions and hard data, failing to embrace the diversity of decision-making processes at all levels of society. Responding to this challenge, we have developed and applied a series of social simulations. This unique tool allows participants to integrate both hard evidence and state of the art systems modelling with soft, social and cultural, aspects. Social simulations provide an accessible problem representation and engage stakeholders into dialogue. In this way we support our clients in finding long-term, robust, and sustainable solutions (see next page for more details).

The catalogue you are reading provides you with a selected list of social simulations that have been developed and applied by Centre for Systems Solutions in sustainable education and transformation planning contexts. We hope that the success stories presented on the following pages will inspire you to explore the potential of social simulations for your specific purposes. For more social simulations created by the Centre for Systems Solutions, visit **systemssolutions.org**. Moreover, if you are interested in other existing games that support sustainability transformation, check our **Games4Sustainability** initiative. "We use systems thinking as a guiding methodology in our projects and initiatives. We rely on solid scientific evidence, respecting both the needs of people and nature."

JAKUB DAMURSKI president

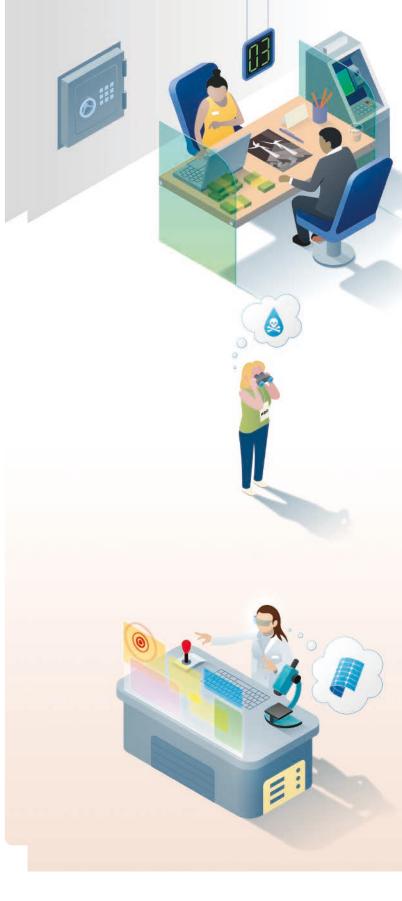
Social Simulations

...offer a combination of group scenario building, role-playing, and game-like mechanisms. They bring together stakeholders with diverse backgrounds and values. For a couple of hours, they interact with each other in a shared, safe environment, which reflects the key aspects of the real world. In this simulated reality, participants take on specific roles, representing different sectors: research, administration, business, NGOs. They have an opportunity to face real problems, confront opposing views, and solve conflicts via negotiations and dialogue. Together, they creatively experiment, tinker, and test in practice new ideas by instantly facing the outcomes of their decisions.

As a result, social simulations enable participants to **expand and revise** their **worldviews**. They help display misconceptions, trigger dialogue and experimentation. The common experience **eliminates barriers among diverse parties, enhancing trust and understanding**.

With an increased flow of information, participants find it easier to build a common language and **act together towards a common cause**. The resulting **mindshift** leads to **creative**, **inclusive**, **and resilient solutions**, as well as inspires to change and action in the real world.

Exploring new pathways towards sustainable development goals, adapting to and mitigating climate change, responsible resource management, transforming the energy sector, advancing individual and social well-being, or creating resilient communities: for all these challenges, social simulations can provide a testing ground, where educators, sustainability professionals, and policy makers can collaboratively set out future options.





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Collaborate towards the Sustainable Development Goals

THE WORLD'S LOUTINGLE DEVELOPMENT GOALS GAVE

Inspired by the Sustainable Development Goals (SDGs) that aim to end poverty, protect the planet, and ensure prosperity for all, **the World's Future** social simulation provides a playful environment for practicing strategies on a way to secure global future.

Each role in this complex global landscape allows specific decisions, requires responsibility, offers space to develop creative strategies and to cooperate with other participants. Thanks to that, participants are able to come up with new ideas and contribute to actual changes in the real world.

11-44 PLAYERS

1-3 MODERATORS

4-5 HOURS, Debriefing Min. 1 Hour

APPLICATIONS

The World's Future simulation was played by policy makers, sustainability professionals and researchers during the workshops for OECD (Paris, France), European Commision (Brussels, Belgium), and European Forum Alpbach (Alpbach, Austria).

The participants control different departments of government, industry, agriculture and population on the global scale.

They face real-life problems, such as climate change, pollution, population increase, migrations, inequalities, resources scarcity, and many other issues.

It's a world full of options: one careless move and and a player is trapped in an endless chain of domino-effect reactions, where the fragile Human-Earth System is put at risk.

WHAT PARTICIPANTS SAY:

"The World's Future shows the importance of an integrated approach to policy-making, which addresses interlinkages between short-term needs (e.g. poverty, social services, law) and long-term needs (e.g. pollution, GHG, inequality). Taking part in this simulation allowed me to actively exchange the ideas with the colleagues from my field and seek multidisciplinary approaches." "I like that we had a chance for experiencing the linkages between some economic and environmental impacts, understanding of the unfolding positions of different sectors, and an insight in the teamwork of the unit. The simulation demonstrates the dependencies between activities and the need to work together on them. It helps see and adopt not only individual objectives but also common ones."



Benefits

Confront the challenge and develop the competencies to achieve the global goals

Identify interdependencies of actions in pursuit of the goals across policies, regions and time

Explore various strategies on the way to a sustainable future

Learn how to promote and integrate technological and social innovations to achieve the goals Recognize negotiating patterns and develop skills for effective communication and collaboration

Realise what contribution you can make to reach the global goals





8-24 PLAYERS 1 MODERATOR 3-4 HOURS

Challenges of water management for energy and food production

The **Nexus Game** gives participants a unique opportunity to get an insight into challenges of water management for energy and food production. At the same time players are struggling to sustain environmental flows. The aim of the simulation is thus to provide an opportunity for practicing how different water management policies can lead to sustainable development of society in harmony with Nature. The players take on the roles of policy makers in two countries that have access to the same river. They have to match the increasing water demand with adequate supply. In order to achieve this goal, effective collaboration and information exchange must be established between stakeholders both within and across the borders. Since the goals of both countries overlap, the game provides an opportunity for practicing conflict resolution and cooperation at the international level.

APPLICATIONS

The simulation was developed in collaboration with the International Institute for Applied Systems Analysis in cooperation with the Sustainable Energy for All initiative.

It is designed to be used within capacity development programs for water, energy, and agriculture sector professionals: ministries, power plants, capacity building institutions, etc.

The simulation was applied and met with approval in many countries, including Ivory Coast (African Development Bank) and Republic of South Africa (Southern African Systems Analysis Centre).



The Nexus Game provides players with a strategic overview of interconnections between water and energy in the context of security and sustainability at the transboundary level. Information sharing, collaboration and communication between various stakeholders is a key element of the simulation.

Benefits

Learn how to balance increasing water demand and solve water-supply conflicts between different sectors and countries Experience problems and opportunities connected with transitions in complex systems where multiple parties, stakeholders and their needs collide Discover the potential of new technologies for increasing energy and water use efficiency Practice collaboration among various organizations and groups of interest whose individual and collective goals differ

WHAT PARTICIPANTS SAY:

"Even if the link between water-food-energy is simple in this game, you can see how these nexus elements interact. You can see how uncertainty of natural processes influences the result of your decisions. Group dynamics can vary a lot between two groups and between two games, and is an important (maybe the most important) part of arriving at decision."

"Thanks to the Nexus Game I've learned about cross-sector decision-making processes and how water, energy, food, ecosystems, climate change are intricately linked."





12-36 PLAYERS

3 MODERATORS

3-5 HOURS, Debriefing Min. 1 Hour

Simulation game where you decide about the future of the energy sector

ENERGYTRANSITION.GAMES4SUSTAINABILITY.ORG

Energy is needed to secure high quality of life to all citizens of the game world.

Become an energy producer or provider, technology start-up, a representative of one of the government departments or a member of a non-governmental organization, and create new solutions for the energy system!

Achieving your goals may not be easy. Energy prices, cost of change, energy demand, harsh competition and consumer satisfaction - they can all affect the outcomes of your decisions.

The mechanisms embedded into the **Energy Transition Game** mimic the changes the decision makers face in the process of energy transformation from fossil fuels to renewable energy sources.

Energy Transition Game - a challenge for decision makers, business and the entire society



Each player takes a different role within a complex energy system landscape. Each role has different responsibilities and decisions to make.



ENERGY PRODUCERS

like every businessmen, try to maximize profits. However, if they ignore negative environmental impacts, they may trigger natural disasters.

ENERGY PROVIDER

faces a challenge of balancing an increasing energy demand and energy supply (energy from renewable energy sources are atmospheric conditions dependent).

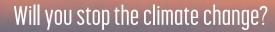
TECHNOLOGY START-UPS

commercialize clean energy technologies. The uncertainties and risks associated with the process make it a challenging task.

B

MINISTRY OF ENERGY

regulates the entire system in collaboration with other governmental departments. The government is constantly pressured by energy consumers concerned about the potential cost of energy transition.



Will you be able to transform the energy system?

Will you navigate through the energy transition processes to arrive at a better, cleaner, and more equitable future?



Limited financial resources, time limit, dysfunctional communication, lack of full understanding of the entire system - all of these might jeopardize achieving your goals.

What is needed is exchange of information, cooperation, system view at the energy production and consumption. In an open game world, all players can freely interact with each other, make agreements, put new policies in place, and come up with creative, out-of-the-box solutions. This way the game not only simulates the real-life complexity of the energy transition but also creates an environment where innovations are born. "Energy transformation will only be a success if we find a way of getting everybody on board. Playing the energy game helped me experience how to create mutual understanding of seemingly opposing roles. The playful joint fact finding made one thing clear: we have to cooperate to find feasible answers to the burning challenges."

JACOB BILLABEL Thema1 founder



APPLICATIONS

The game has been successfully applied at festivals, seminars, workshops and conferences in many European countries. It was played by participants representing all sectors: business, administration, research, and NGOs The simulation was co-funded by the Climate Knowledge and Innovation Community through the project: Accelerating Urban Energy Transitions.



Benefits

Learn how to navigate through the challenges of energy transition

Generate and test transition strategies to new energy sources Experience and understand the complexity of system-wide change

Develop skills for effective communication and collaboration Learn how to foster and integrate both technological and social energy innovations

Are you ready to take on the challenges of the energy system transition?



12-36 PLAYERS

TABLET OR COMPUTER WITH INTERNET ACCESS PER EACH PLAYER OR GROUP OF PLAYERS

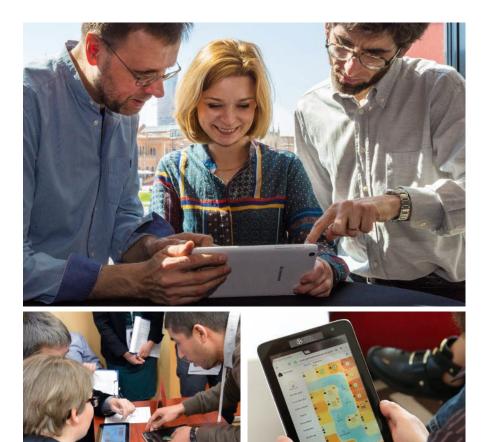
4-9 HOURS

Collaborate to navigate safely through complexity

The Lords of the Valley social simulation combines the challenges of solving complex problems with fascinating dynamics of human interactions. It's a laboratory for practicing strategy, collaboration and leadership in a complex environment.

LORDSOFTHEVALLEY.GAMES4SUSTAINABILITY.ORG

Participants take on the roles of individuals and organizations operating in a flood- and drought-prone river valley. While trying to achieve their goals, they face many challenges arising from the decisions of other players and from the unpredictability of the environment.



APPLICATIONS

Since 2011, the simulation has been applied in many contexts: from improving the collaboration between policy makers, experts and communities in flood-prone areas to diagnosing organizational problems in international companies. The Lords of the Valley simulation was played by universities, NGOs, enterprises and think tanks in, among others, the Netherlands, Hungary, Poland, China, Austria and the USA.

Lords of the Valley: experience and explore sustainable practices in complex environments "I participated in the game and found it to be engaging, fun, and surprisingly useful to understand, given a relatively brief period of time, some of the collaboration challenges that individuals and organizations confront in working together in policy contexts."

PROF. ALAN TOMKINS, Director, University of Nebraska Public Policy Center

"The game was dynamic and innovative, and participants were effectively encouraged to engage more. The game stimulates its participants to think through their activities in a complex environment, not only during the game, but especially in their own life, and during strategic decision process in their institutions. We strongly recommend to launch the game in various institutions and for multidisciplinary target groups."

WROCLAW RESEARCH CENTRE EIT+

Benefits

Teach, learn and have great fun

Face the complexity of the real world

Diagnose organizational problems

Master systems thinking

Communicate and collaborate effectively

Get free educational tool for non-commercial use

Explore the connection between sustainability and business success



3-24 PLAYERS

COMPUTER WITH INTERNET ACCESS PER EACH PLAYER OR GROUP OF PLAYERS

1,5-3 HOURS

Green&Great is a simulation game about business transition towards sustainability. It is suitable for both professional training and university courses.

Trainees or students assume the roles of managers in large consulting companies. They compete for clients and seek to make profit, while achieving social goals and reducing environmental impacts.

The dilemmas players face, the decisions they make and their consequences are deeply rooted in the today's corporate reality. This creates an experience that leads to deep reflection on business sustainability as a source of competitive advantage.

Bring sustainability to life in a business context

"The game is great for consulting company teams or for businesses who are working towards and trading in the sustainable development field. The game gives good opportunities for insight into how business is transforming, and it can help enrich the dialogue with business that you find in public-private partnerships."

GILLIAN MARTIN MEHERS the Founder of Bright Green Learning @Atadore SARL

APPLICATIONS

Trainers, teachers and consultants from all around the world have included the Green&Great simulation in their workshops and courses. The game was run in, among others, EY (Ernst&Young), Lufthansa, Al-Sayer Group, University of Bradford, and Frankfurt School of Finance & Management.

"The game was a great way to introduce the sustainability concepts and how different sectors (economy, environment, etc.) are inter-related."

ANDREW game workshop participant



Benefits

Engage your audience

Change attitudes and actions

Experience complex business reality

Practice strategic and leadership skills Effective learning in less than 2 hours

Explore transition scenarios with the Sustainability Compass

Easy to play and fun





A Game for climate and democracy

8 PLAYERS OR MORE

TABLET OR COMPUTER WITH INTERNET ACCESS PER EACH PLAYER OR GROUP OF PLAYERS

1-2 HOURS

New Shores is an online multiplayer game that takes players on a quest to settle a green, vibrant island. Wild forest covers its surface, hiding rich coal deposits underneath.

Free to govern themselves, players can communicate and collaborate - or go through the game without giving much concern to the others. Using coal can dramatically improve the island's development.

But what will be the cost? Climate and democracy shouldn't be taken for granted.

As with all

human activities, progress comes with a price. The further in the game the participants get, the more difficult it becomes. Will they try to multiply their personal wealth or rather work for the public good? Will they exploit the coal deposits and gamble with the climate change? Or maybe they will play it "green"?

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New Shores is a game about experimenting with different strategies while negotiating, cooperating or competing with other players.

APPLICATIONS

New Shores was created under funding from the Erasmus+ Programme of the European Union. The game is used to promote sustainable development and pro-ecological attitudes as well as social and civic competences, sense of entrepreneurship and basic science and technological skills among the young citizens of Europe. New Shores is based on the Climate Game that has been played in Poland, China, Hungary and in many other countries, as part of many workshops focused on sustainability and climate change.

Are you ready to take the fate of the island in your hands?

"In our organization we believe in face to face contact or group work, so it is needless to say that I was quite sceptical when presented with an online game. I couldn't imagine any experiential learning coming out of this whole experience, but I was quite wrong. Once we understood all the instructions and started playing the game I was completely transported back to being a childlike free spirit, who enjoys the game enormously. The game itself serves two purposes that for me are crucial in any exercise: it has to be entertaining, and it has to provide food for thought, based on which you can change some of the stereotypes that you used to believe in. New Shores does both extremely well."

MÁRIA BORVÁK TANDEM, n.o.

Benefits

Learn and explore practices that promote sustainability

Discover correlation between greenhouse gases and climate change

Learn the mechanics of how the climate change happens

Learn skills for effective communication and collaboration

Practice strategic and leadership skills

Set and align goals, negotiate conditions and coordinate actions **10 PLAYERS OR MORE**

TABLET OR COMPUTER WITH INTERNET ACCESS PER EACH PLAYER OR GROUP OF PLAYERS

1-2 HOURS

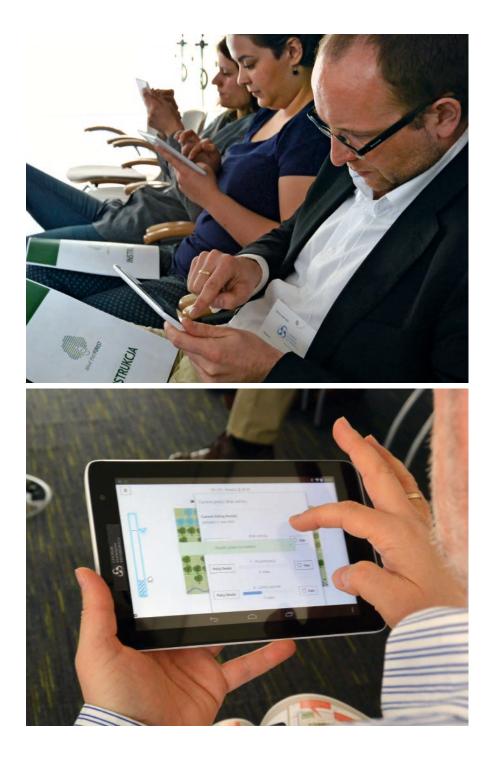
How incentives, institutions and worldviews sustain the common good... or lead to the tragedy

A winner of the Nobel prize in economics, Elinor Ostrom listed a number of conditions that enable individuals and organizations to avoid the tragedy of the commons. As with all theories, however, putting these principles into practice may not be easy. Conflicting values, short-term focus, and reluctance towards imposed regulations may undermine any efforts to reach effective and sustainable resource management.

Meanwhile, inclusive solutions that adopt multiple worldviews may prove successful in long term even though they may not be optimal for all. With the broader group of stakeholders the range of possible options and tested solutions expands. All this leads to more stable rules for effective management of common goods, such as forest, clean freshwater, healthy ecosystems, or public safety.

The **About That Forest** game is a sandbox for exploring how individual and collective behavior is affected by economic incentives, institutions, and moral norms. In a simple world of a community jointly managing their forest, participants can negotiate and act towards prosperity or... fail and end up struggling with the tragedy of the commons.

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Players become the members of a village community who live off the jointly managed forest. While the community rules don't always match their individual needs, players passionately argue about them, rebel or renegotiate conditions. The dilemmas faced by villagers serve as a metaphor for social, economic, and cultural processes driving critical sustainability issues.

APPLICATIONS

The game was developed in collaboration with the International Institute for Applied Systems Analysis (IIASA). It has been played in Austria, Poland, Hungary, China, Ireland, and many other countries. About that Forest is also regularly used as an experimental research tool at IIASA. "In the game we covered individual decisions making or collective decisions making on risk and uncertainty. I think what we all learned, it has to be both. We have to think about our own good, income, good education for us, for our families. And the same time we have to think about our collective wellbeing. [...] So I think it was big success to the end. It was fun for us - teachers as well as for the students."

REINHARD MECHLER Risk Policy and Vulnerability program, deputy director

"I think it's a very good simulation - what is happening in reality. You see how much personal factor plays a role how much selfish interests play a role and how it is insanely difficult is to follow a collective goal."

PARTICIPANT, European Forum Alpbach

Benefits

Explore economic, social, and cultural aspects of common goods management

Conduct experimental, cross-cutting research with a flexible and engaging tool

Let your students experience the tragedy of the commons and test possible strategies to prevent it

See how various incentives, institutions and worldviews affect individual and collective ability to negotiate, cooperate, or compete



Experience, explore, and learn about community flood resilience

8-16 PLAYERS 2-4 HOURS

Linking the development and growth with disaster risk management is a tough task. Risk reduction planning often gives way to immediate actions that ensure short-time relief but fail in providing more permanent safety solutions. While the role of hard infrastructure makes it the main focus of flood management efforts, other aspects, like social, natural, human and financial capital, are frequently overlooked.

Photo copyright © Michael Szoe



Understanding resilience is not easy! It requires a change in thinking.



The Flood Resilience Game is set in an area exposed to seasonal floods. Players take on the roles of community members (workers, farmers, entrepreneurs, financial services agents), local government and water board officials. The direct interactions between players create a rich experience that can be discussed, analysed and lead to concrete conclusions and actions. This allows players to explore vulnerabilities and capacities leading to an advanced understanding of interdependencies and the potential for working together.

APPLICATIONS

The game was used in Indonesia and Peru by the members of the following NGOs: Practical Action, Red Cross Indonesia, the International Federation of Red Cross and Red Crescent Societies, Mercy Corp, Plan and Concern Worldwide. It was also played in Nepal and Spain with the local flood professionals.

Funded by:

"We have learned to work as a team, to consolidate ideas, and be more resilient in our decision making. To see our reality and know how we could be affected and what we need to do about it."

RUDIT, game participant

Benefits

Experience the effects on resilience of investments in different types of "capital" - such as financial, human, social, built, and natural

Improve understanding of the influence of preparedness, response, and reconstruction on flood resilience

Demonstrate the benefits of investment in risk reduction before the flood strikes

Explore the complex outcomes from long-term development pathways

Discover how to avoid creating more flood risk in the future through enhancing participatory decision-making

Experience complex ideas and connect them with participants' daily realities









Cultural memory in the context of community resilience

6-12 PLAYERS 2 TABLES REQUIRED 1-2 HOURS

> Nowadays a thriving metropolis, an anonymous city **Cultural Memory Game** is set in, witnessed a severe disaster almost a century ago. However, with an influx of new people and no major catastrophe having occurred since then, players (assuming the roles of city inhabitants) are blissfully neglecting any need for implementing prevention and preparedness measures...

... until the next disaster strikes.

The game draws on the concept of cultural memory as the key factor contributing to community resilience. The bits and pieces of past catastrophic events are scattered around the city, offering prompts to those who are ready to relate facts. Will you use your time to visit the Local Museum or would you rather opt for a shopping spree?

The choice is yours, but it will certainly affect your future!



APPLICATIONS

The game was designed and developed as part of the project European Disasters in Urban Centres: a Culture Expert Network within the EU Horizon 2020 Programme. The game has been played by the inhabitants of earthquake-exposed Volos (Greece) and flood-prone Dordrecht (the Netherlands). The game is a useful tool available to teachers and educators to raise the awareness of the role of cultural memory in the face of adversity. "This game really sticks in your mind. It not only touches upon the problem of earthquakes, but it also lets you experience how a victim of a disaster may feel."

WERONIKA FUDALA, student, University of Wroclaw

"I use the Cultural Memory Game to create awareness and inform the players about the possible impacts of a flood. The players can experience a situation they have most likely not experienced in their own lives, and can take measures that will either increase or decrease the impacts, teaching them valuable lessons they can use to prepare themselves and their immediate surroundings. So far the reactions have been very positive and we are planning on expanding the use of this game more and more in the coming year. "

RIK HEINEN, water policy advisor of the Municipality of Dordrecht

Benefits

Learn from the past to shape your present and future

Understand the role of cultural memory in developing resilience

Master decision-making in an uncertain environment

Interpret and relate facts

Set and align your goals

Game developed in collaboration with: The Volos Development Company (ANEVO S.A.), Earthquake Planning and Protection Organization, Museum of the City of Volos, Municipality of Dordrecht

Diversity in the context of flood resilience

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The **Gifts of Culture** board game is a role-playing simulation set in a diverse cultural community. Players represent various groups living in the flood-prone valley. Although their views and ideals differ, they are driven by the same goal - to improve living conditions in their communities. How will they achieve this goal under the constant threat of devastating floods? Information exchange and collaboration can greatly enhance the decisionmaking process, however, diverse cultural backgrounds do not make this task easier.



8 PLAYERS

2 TABLES REQUIRED

1-3 HOURS

GIFTSOFCULTURE.GAMES4SUSTAINABILITY.ORG

...



"I've learned that long-term decisions are more effective, but they require a collective effort. And it's difficult to collaborate with each other when interests of different groups are often unknown to the others."

GAME PARTICIPANT

"The game helped me realize just how difficult cooperation is between many different groups of people, without a leader who would organize the meeting and committee's work."

GAME PARTICIPANT



Play and use The Gifts of Culture game to enhance community flood resilience

APPLICATIONS

The game was designed and developed as part of the project European Disasters in Urban Centres: a Culture Expert Network within the EU Horizon 2020 Programme. The Gifts of Culture has been played in many countries by the representatives of academics, NGOs, and policy makers.

Benefits

Learn how cultural factors affect disaster preparedness and ability to cope with the emergency situation

both challenging and beneficial aspects of cultural differences,

helping to turn diversity into opportunity.

Improve collaboration and information sharing between organizations and individuals representing diverse cultural backgrounds Promote more effective communication of disaster risk management among culturally heterogeneous communities 27

Our activities





- 6 ESTONIAN MINISTRY OF ENVIRONMENT Energy Transition Game
- **EUROPEAN FORUM ALPBACH** The World's Future
- INTERNATIONAL INSTITUTE FOR APPLIED SYSTEMS ANALYSIS Many games
- STOCKHOLM ENVIRONMENT INSTITUTE Gifts of Culture
- **WUPPERTAL INSTITUTE** Energy Transition game

Lords of the Valley MICHIGAN STATE UNIVERSITY

GOETHE-INSTITUT

- PIPES (Public Infrastructure Participatory Engagement Simulation)
- WAGENINGEN UNIVERSITY
 ORESEARCH CENTRE
 Gifts of Culture
- **ZURICH FLOOD RESILIENCE ALLIANCE** Flood Resilience Game
- HUMAN AND ENVIRONMENT LINKAGE PROGRAMME Lords of the Valley



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