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## SYNTHESIS OF THE WEBINAR

# FROM GAMES TO ACTION: WHEN AND HOW CAN SERIOUS GAMES STIMULATE LEARNING AND SUPPORT DECISION MAKING FOR NATURAL RESOURCE MANAGEMENT? 4 JULY 2019, 15:00-16:30 CEST (GMT +2)

ORGANIZED BY:  
**THE LEARNING COMMUNITY OF  
THE INTEGRATED ASSESSMENT SOCIETY**  
*Report prepared by: Joanne Vinke-de Kruijf and Blane Harvey*

## Background and Focus

Natural resource management is a field with longstanding use of participatory processes. Assumptions that the involvement of locals and use groups in decision-making contributes to better decisions has greatly influenced the spread and use of a range of different participatory tools in practice. More recently this has included a growing number so-called ‘serious games’ as tools for education, awareness-raising and collective learning. This trend has also been of interest to the academic community which has sought to understand the effectiveness and impact of participatory tools, and has exposed some limitations. Concerns have been raised, for instance, about how participatory tools and processes address power imbalances and accommodate groups with low levels of literacy or numeracy (Few et al. 2007; Muro and Jeffrey 2008).

As revealed in recent literature reviews, research on serious games in the field of natural resource management is growing (Rodela et al. 2019; den Haan and van der Voort 2018). However, this research is largely focused on the development and delivery of the games themselves, and less on the supposed impacts of the game intervention. As such, questions about when and how serious games can serve as tools in support to learning, and long-term change processes have yet to be fully addressed. We take this gap as a point of departure for this webinar.

In the webinar we explored the following **three questions**.

1. How can serious games be applied to foster transformative change in policy, practice and to generate learning and social learning?
2. Is there evidence from practice that serious games can foster transformative change and sustainable practices among actors?
3. What are the challenges and issues faced with serious games in natural resource management?

During this Webinar we looked closer at what *serious games* are, what their potential is and how can be these used to support natural resource use and its up-take across different context.

This document provides a synthesis of the presentations and the discussions. This synthesis report was prepared by Joanne Vinke-de Kruijf and Blane Harvey in consultation with the presenters.

**Link to the recording:** <https://webconf.vc.dfn.de/pde3pmuvf6e1/>

# Synthesis of presentations and discussions

## Serious gaming, natural resources management and learning

**Robert-Jan den Haan** (University of Twente)

Robert-Jan began by offering two possible definitions of serious games:

- A broader definition: “Games that have a primary purpose other than entertainment, such as educating, training or informing players.”
- And a narrower definition: “Experi(m)ent(i)al, rule-based, interactive environments, where players learn by taking actions and by experiencing their effects through feedback mechanisms that are deliberately built into and around the games.” (Mayer, 2009, p.825)

He then introduced the virtual river he developed and the lessons he learned from the development process. Compared to the other serious games, this serious game is much more technical. He emphasized the importance of prototyping and user testing, as part of an iterative design process. He also noted that game developers should consider how the perceived credibility, legitimacy and saliency of games (see Cash et al 2003) will differ depending on the users playing it, and approach their design with these perceptions in mind.

Robert-Jan then discussed some of the findings of the review he conducted into the evaluation of social learning outcomes of serious games. The key message emerging from the review is that there is a need for greater focus on developing robust, well-documented, and longitudinal assessments of the contributions of serious games. Developers should think about evaluation from the moment of design through to follow-up assessments of how the experiences from the games have translated into real-world thinking or behavior.

### Questions & answers

<p><i>Joanne Vinke-de Kruijf: who played your game. Apart from water experts, who was involved? Citizens? Other type of experts?</i></p>	<p>For the previous play test, water engineers/researchers, nature managers/ecology researchers, citizens and researchers not related to and with limited knowledge on water management.</p>
<p><i>Merel van der Wal: Have you considered other features than credibility, legitimacy and salience? For example, practical usefulness or relevance, which is in practice often interpreted differently than on a more abstract level in terms of boundary objects. Or would you say those connect directly to the Cash features/characteristics of boundary objects? and in extensions: would different stakeholders report differently on those features?</i></p>	<p>The Cash characteristics relate to boundary objects. There are certainly other features we consider, e.g. applicability (can the game be applied in river management/to explore a scenario) and usefulness (to what extent is the game consider useful, i.e. what is considered its added value). At least that is how those are referred to in design engineering.</p> <p>I would say there is a link yes, saliency links to the relevance. But researching what is relevant is something that should definitely be part of the design. In our project, we did a social-constructivist study to research the challenges that stakeholders in river management perceive and what their perspectives on these are (we applied Cultural Theory) to take a user-centered view on what these stakeholders are encountering in practice, what they are looking to do about it and what kind of information they want/what dials they want to turn. We did not (yet) evaluate whether or not players think that we achieved that.</p>
<p><i>Machteld Schoonenberg: How did you calibrate the outcome/impact of your games? With the input data as guiding principles? Or by testing (e.g. through a survey) if the main messages came across with the players? I'm referring to balancing variables.</i></p>	<p>It's a little complicated to explain the simplification of what we are doing now, but we have now chosen to work with real models in our game. So most of our simplification is now in the game board we developed, which is a fictive area with a fixed hexagon grid rather than a 'smooth' world. The further calibration of that is mostly done with going back and forth between field experts as well as testing. And to add an experience to that: it's not easy to engage field experts. Some might be open to the simplification idea, some aren't. They are experts in their field, you are (perhaps) not, and they aren't in</p>

your field. What works best, in my experience, is to have the experts experience the game, playtest internally basically.
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### Further reading

- Baird, J.; Plummer, R.; Haug, C.; Huitema, D. Learning effects of interactive decision-making processes for climate change adaptation. *Glob. Environ. Chang.* 2014, 27, 51–63.
- Cash, David, et al. Saliency, credibility, legitimacy and boundaries: linking research, assessment and decision making. 2002.
- Den Haan R.J., Van der Voort M.C. On Evaluating Social Learning Outcomes of Serious Games to Collaboratively Address Sustainability Problems: A Literature Review. *Sustainability.* 2018; 10(12):4529
- Harteveld, Casper. Triadic game design: Balancing reality, meaning and play. Springer Science & Business Media, 2011.
- Ishii, H. Tangible bits: beyond pixels. in Proceedings of the 2nd international conference on Tangible and embedded interaction. 2008. ACM.
- Mayer, I. The gaming of policy and the politics of gaming: A review. *Simul. Gaming* 2009, 40, 825–862.

### Games for strategy exploration in peri-urban drinking water problems

*Sharlene Gomes (TU Delft)*

After introducing the challenges of peri-urban drinking water supply in Bangladesh and the factors that play a role (institutional set-up, multi-actor context and peri-urban dynamics resulting from urbanization), Sharlene introduced the game that she developed, which features role-playing and scenario exploration. Three games were developed and applied as part of an interactive workshop with peri-urban communities. It was used to help them better understand their drinking water problem through an institutional lens. She reflects on learning impacts practical challenges facilitating the game in a different language, as well as more general question regarding the game’s potential in supporting transformative change.

Sharlene noted the benefits that community members in helping them to understand the perspectives of different actors and develop new strategies to effect change, but that this depends on a deep understanding of the community context in game development. She noted the importance of facilitated sense-making workshops following the games for deepening learning, but also emphasized that measuring long-term effects of the games remains a challenge.

### Questions & answers

<p><i>Blane Harvey: I'd be curious to know more about how you evaluated the outcomes of the game.</i></p>	<p>For learning we evaluated problem understanding before the workshop and after each game session. We asked participants if they discovered new actors, problems, solution strategies etc. from the games. To evaluate if participants could apply this type of problem examination to other problems participants were asked to identify the players, actions, resources, values in one of the sessions before game materials were handed out.</p> <p>In addition to learning, we also evaluated the game and the workshop. The game was evaluated with respect to clarity and real-world representation. And the workshop was evaluated in terms of workshop structure, facilitation and overall experience. More info about the evaluation protocols during the workshop is provided in our journal paper (see below).</p>
<p><i>Romina Martin: I am curious about the institutional challenge - how was it discussed in your game? Did players come up with suggestions like where they have to formalize or collaborate differently?</i></p>	<p>In the 3rd game session, participants had an opportunity to negotiate different rules for monitoring groundwater resources. The game design could also have been more open to prompt participants to design their own rules during the games as well.</p>

## Further reading

Gomes, S., Hermans, L., Islam, K., Huda, S., Hossain, A., & Thissen, W. (2018). Capacity Building for Water Management in Peri-Urban Communities, Bangladesh: A Simulation-Gaming Approach. *Water*, 10(11), 1704. <https://doi.org/10.3390/w10111704>

## Serious Games

**Bettina Koelle** (Red Cross Red Crescent Climate Centre):

Bettina is applying serious games in a slightly different context. In her experience, they allow participants to connect to a context and with a certain group. She stresses that games do not only help to understand complexity but may also stimulate empathy, forgiveness and other broader learning processes. Games are a very good platform for stimulating in-depth reflection in a safe space where participants can take some risks. They are not the only means to facilitate a learning process but can also serve as an input to wider collective processes.

When preparing a game, Bettina noted that is key to think about learning objectives and processes as well as about the audience (who needs to leave their comfort zone and should have opt-out options). She noted that capacities and soft skills may need to be developed for people to effectively take part in these types of serious games. Good facilitation is key and demands a good skills set.

## Questions & answers

<i>Blane Harvey: I would be keen to learn a little more about how you prepare your teams to facilitate these processes. Is there a set of skills/attitudes that you try to develop before they pick up the games?</i>	Facilitation is very important. This is a process that you adjust all the time. In that sense there tends to be a very intense learning process on the side of the team as well.
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## Further reading

<https://climatecentre.org/>

## Playful Games for serious purposes: Inspiring curiosity, Collaboration, and Creativity

**Ilan Chabay** (Institute for Advanced Sustainability Studies)

Ilan introduces us into the potential of playful, serious games. Games have different aspects and careful development may allow for a range of learning outcomes to occur. They can stimulate questions and experiential learning. They help people to step away from their daily agenda and perhaps even from lock-in situations. Games can even transcend language and introduce people into complex systems. Ilan shows several examples of how he has been using games to achieve these purposes.

## General questions and answers

*Joanne Vinke-de Kruijf: Bettina stressed the importance of joint experience, which is key for collective learning. I wonder whether the previous speakers also considered the collective aspects when selecting participants (e.g. include diverse participants on purpose to promote learning.*

*Njuguna Lucy: and in addition to selecting diverse participants, how do you as a facilitator deal with conflicting perspectives and even ideas for how to deal with the problem at hand?*

- Sharlene Gomes: in Khulna we made efforts to include different kinds of participants from the village. For example, long term residents, migrants, gender balance (it's important to give women a bigger role in the problem solving process as they are the ones that are directly impacted), people with different socio-economic backgrounds. Even in the village, the participants were diverse so we tried to balance the participants based on the social composition.

*Joep Schyns: The examples of games I have seen in this webinar (and in general) all involve multiple players in a physical place, and a facilitator as well. a) Is it possible to have a successful serious game (read: player learns something) in which a single player plays against a computer? Are there any examples known? b) Can effective learning be achieved in such a setting (especially since reflection afterwards is so important as Bettina stressed)? c) What would be points of attention for designing such a player-computer game?*

- Merel van der Wal: Yes, there are, but the dynamics of the social part make the learning in groups so hard to facilitate/manage/measure. In medical sciences there are many examples of single player games in learning (education)

- Romina Martin: I have a single-player example for you on managing land use change: <https://www.sciencedirect.com/science/article/pii/S1364815214003557> (www.landyous.org). We measured the ability to learn from the game by a standardized survey on intrinsic motivation which is a prime indicator to which degree learning is possible.
- Machteld Schoonenberg: Yes, we did a nice project with a computer single player game we developed. tricky was how to balance simulation and simplification (real data input vs relevant output); hence my earlier question. :-) would be curious to hear others considering how to deal with normative choices in simplification process.
- Joep Schyns: Yes, since there is no facilitator to clarify things, the challenge is to make the game fully self-explanatory (so not too complicated).
- Machteld Schoonenberg: To respond to the discussion on having no facilitators with single player and computer game: our game wasn't a good example in that sense, as it turned out to be successful... to a very different audience than we targeted!
- Bettina Koelle: the question about facilitation is a very important one.

## Concluding reflections

At the end of the webinar, each presenter was asked to share his or her personal “take home” message.

**Robert-Jan** emphasizes the importance of expectation management. A game is perhaps a starting-point for a large discussion. A setting where actors can interact in a safe environment, out of their normal context. In his experience it is important to stress to participants that a game is not a tool for designing interventions.

**Sharlene Gomes** stresses that games can play a key role in knowing how to learn i.e. developing new ways of framing and analyzing problems. Certain problem solving elements of games are perhaps generalizable to other issues.

She is now developing a manual for practitioners to apply this type of strategy exploration game in other contexts.

Sharlene further reflects on the difference between incremental learning versus transformative change. Whether transformative change is possible depends on the context. If a suitable window of opportunity exists, a serious game may be used to experiment with transformative change. However, measuring the impacts is challenging given the timescales along which transformative changes occur.

**Bettine Koelle** reiterates the potential of experiential learning to improve system understanding, to deal with challenges and perhaps even to unlearn. Games can create empathy. It helps people to let go of their daily agendas, which is very important to allow for transdisciplinary working. She raises the need for capacity building to enhance the necessary skills for designing and facilitating games.

**Ilan Chabay** reflects on the fact that we have seen diverse applications of serious games. He has been trying out different forms of a game at different points in time. As for the distinction between incremental learning and transformative change, he argues that transformative change may happen in many different ways. Incremental learning can play a role as well as engagement with different groups.

### Concluding remarks by Joanne Vinke-de Kruijf and Blane Harvey:

- We have seen a very diverse set of games, which are applied in different contexts and for different purposes.
- Games can play a valuable role when dealing with contested issues. Yet, skilled facilitation is very important, as is embedding the game within a wider process of engagement.
- Bettina and Ilan both stress experiential learning as the most relevant kind of learning that emerges from serious games. Experiential learning plays an important role in transformative change.
- In most of the cases highlighted during the webinar the importance of understanding the context within which the game is being played was seen as important for both designers and facilitators. This makes the transferability games slightly more complex and invites us to think carefully about how they think they will contribute to specific decision or change processes.



### Further reading and references:

- <https://games4sustainability.org/> a platform for serious games, which includes +100 games and social simulations that are relevant for sustainability.
- Romina Martin: a link to the board game NomadSed, on which we have not yet published articles, but it was used by development organizations: <http://info.nomadsed-spiel.de/index.php/en/> In this game, players experience the tragedy of the commons from the perspective of pastoral herders.
- Romina Martin: A web-based landuse simulation landyous.org, with the following article: Schulze, J. et al., 2015. Design, implementation and test of a serious online game for exploring complex relationships of sustainable land management and human well-being. *Environmental Modelling and Software*, 65. <https://www.sciencedirect.com/science/article/pii/S1364815214003557> In this single player, round-based, system dynamics simulation, the player decides on land use change and societal investments in the role of a major with the goal to reach sustainability (high levels in economy, social- and nature indicators)
- Aubert, A. H., Medema, W., & Wals, A. E. J. (2019). Towards a framework for designing and assessing game-based approaches for sustainable water governance. *Water*, 11(4), [869]. <https://doi.org/10.3390/w11040869>