SESSION REPORT

Biodiversity Conservation, Voluntary Commitments and Games.

Claude Garcia, Anton Bommel, Pierre Bommel, Julien Chupin, Helene Dessard, Anne Dray, Abigail Fellay, John Garcia-Ulloa, Fabien Quetier.

The BioDev 2030 project seeks to mainstream biodiversity conservation and development through voluntary commitments in key sectors emerging from multi-stakeholder dialogues in 16 pilot countries participating to the project. One of the main challenges in securing these is to get insights in the interests of the stakeholders involved and the process by which it is possible to come to joint solutions. How to support stakeholders that are not informed, do not believe, do not care, or do not have the means to enact change?

Julien Chupin and LEAF Inspiring Change help stakeholders build agreements through the use of facilitation and strategy games. BioDev2030 requested Julien Chupin and LEAF to organise a workshop to engage its key partners with a demonstration run of MineSet, a game coupling ecological and social drivers of change in tropical forest landscapes, during the IUCN World Conservation Congress in Marseille in September 2021. Its title was "capacity building workshop to engage stakeholders".

The report presents the session, the take home message, the bottlenecks to address for the efficient implementation of the Biodev2030 project and potential next steps. We also address some of the most frequent questions participants ask when they first discover this approach.

SESSION REPORT

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Session report

INTRODUCTION

Reversing the trend on biodiversity loss will require a concerted effort across all sectors and geographies. The combined and interacting effects of land-use change, resource extraction, defaunation and climate change are pushing these ecosystems towards critical points. Can we operate the transition before it is too late? If yes, what is required? The answer to the first question is yes, according to Leclère et al. 2020 (1). They outlined the possibility of a biodiversity transition for the 21st century, outlininge strategies that have the potential to stop the downfall of global terrestrial biodiversity by 2050 and redress it to a pre-1970 level by 2100. The answer to the second one rests in the process of decision-making. For the transition to happen, decisions need to change. For decisions to change, one way is to change the way the decisions are taken. Waeber et al (2021) present a framework that shows the importance of (1) information, (2) beliefs, (3) values and (4) means to enable transformative change (2). Only a combination of these can help stakeholders mainstream biodiversity conservation and development.

BioDev 2030 addresses the causes of biodiversity decline by encouraging all stakeholders in 16 pilot countries to commit to its preservation, and by promoting voluntary initiatives based on scientifically sound targets. Each pilot country is invited to formalize commitments to reduce pressures on biodiversity in at least two key economic sectors. Tested in 16 pilot countries, BioDev 2030 aims to demonstrate the effectiveness of a participatory and inclusive science-based approach to achieving the biodiversity targets. BioDev 2030 thus seeks to develop and pioneer a participatory approach to facilitate multi-stakeholder dialogues, foster the emergence of a common vision and agree on voluntary biodiversity commitments for key sectors of the economy. How can we build these agreements when stakeholders have different information, beliefs, values and means?

Since 2018, LEAF Inspiring Change in collaboration with a variety of research institutions (ETHZ, CIRAD, BFH) and other partners (Biovision, Biotope, Julien Chupin) has developed and tested models that couple ecological and sociological drivers of change to support dialogues in natural resource management. Transforming these models into strategy games, we integrate these 4 dimensions of decision making (information, beliefs, values and means) – giving participants the opportunity to share and confront their perceptions and develop their negotiation skills through new forms of dialogue.

BioDev 2030 commissioned Julien Chupin and LEAF to engage its stakeholders during the IUCN World Conservation Congress, in Marseille. The specific objectives were to:

- Help engage the project stakeholders;
- Support the participants in developing a common vision and strategy;
- Contribute to create, expand and influence a community of interest.

WORKSHOP PROGRAM

The program for the day was to:

- Play a strategy game to explore how to build agreements amongst stakeholders;
- Build a common strategy: ambition, key initiatives and priority actions;
- Evaluate the workshop results.

The workshop started at 9.45 am. After a quick introduction, the game session started. Participants were invited to negotiate a biodiversity agreement before the lunch break. In the afternoon, the participants finished the game and then debriefed it. Due to time constraints and a very disproportionate number of country representatives, country specific action plans were not developed. The focus was placed on priority initiatives and actions for the Biodev2030 project.

METHOD

We use Companion Modelling (ComMod) to engage stakeholders. It is a participatory approach that designs and uses games and simulation models to help people tackle complex issues in the fields of renewable resources and environment management. It is in particular suitable for complex problems where a multitude of stakeholders have different and often conflicting views and interests. ComMod promotes dialogue, shared learning and collective decision-making, strengthening the adaptive management capacity of stakeholders facing wicked[1] environmental problems. In the ComMod approach stakeholders and researchers work together to develop a collective understanding of the system and explore possible strategies to enact change.

One of the critical components of the approach is the process by which a person playing the game takes on the role of a stakeholder. This has a profound impact on his or her understanding of the system, and has the potential to reshape its perception and increase its strategic depth. The experience of the game plays a central role in the learning process. The best way to understand the strengths and limits of the approach is to take part in such a modelling or game process.

In view of this, we organized a full-day workshop at the IUCN World Conservation Congress, in Marseille on September 8th, 2021. The first part of the day was devoted to a game session using the MineSet game developed by the CoForSet project. The second part was used to debrief the game sessions, elicit lessons learns and propose next steps.

[1] See the Glossary: http://www.fordev.ethz.ch/research/glossary.html

MODEL

Summary

MineSet™ is a model of regional landscape change developed to explore the future of tropical forest landscapes in Central Africa over the next decades. It places players in the roles of CEOs of logging or mining companies, interacting with markets, governments and NGOs, planning their activities and developing strategies to cope with the environmental, economic and social impacts of their decisions (Fig.1). All the major underlying drivers of land use change are featured: demographics, economical and finance signals, governance and transparency, technological changes, and cultural differences. As the game unfolds, the players discover the complexity of the system, and devise new rules and strategies to balance development and conservation. The model was developed through the CoForTips and CoForSet projects, funded by the ERA-Net BiodivERsA, with the national funders ANR, BELSPO and FWF and the Fondation pour la Recherche sur la Biodiversite (FRB) with support from the Fonds Francais pour l'Environnement Mondial (FFEM).

Interaction diagram

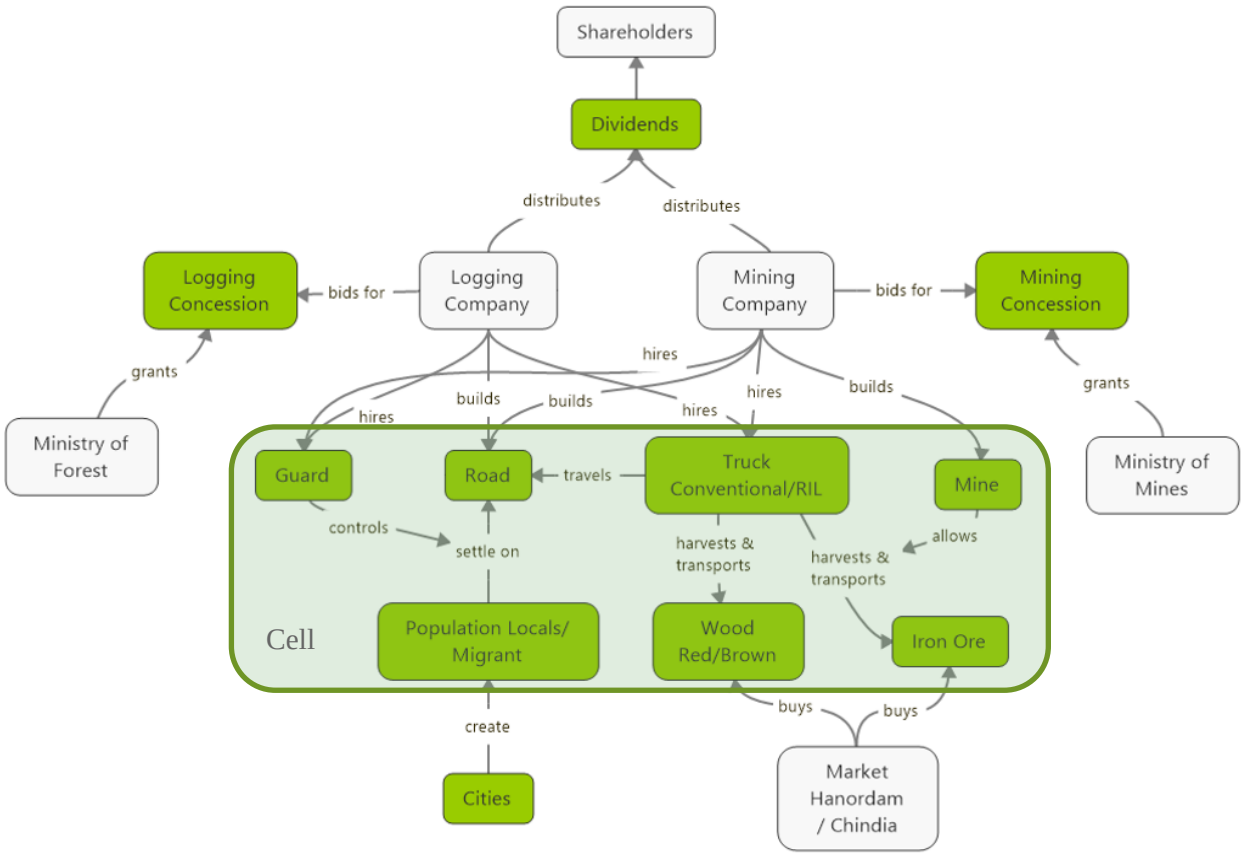


Figure 1: The MineSet conceptual interaction diagram. White boxes represent actors, controlled by players or by the research team. Green boxes represent resources. Most of the processes are located in the landscape, made up of a collection of cells (light green box). The arrows represent the possible interactions between all the model components. Source: Garcia & Speelman 2017.

Figure 2: The MineSet game. All the components of the system represented in the conceptual diagram (Fig. 1) are represented in a physical form. The hexagonal cells host roads, trucks, guards and populations. Players place the tokens based on their strategies and capacities. They negotiate agreements and alliances with other players or stakeholders represented by the research team. Photo: C.Garcia 2017.

Model engine

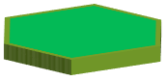
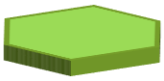
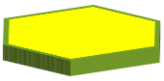
The rules of the game describe the economic, social and environmental processes at play in Central Africa. Core to the model is the process of forest growth and the interaction between ecological processes and human activities. Each cell has a value of Forest cover (F) ranging from 0 to 10, represented visually with a different colour according to three broad land cover types (Tab. 3). This classification, developed independently, corresponds to a similar typology developed by the High Carbon Stock Steering Group (www.highcarbonstock.org).

In addition, each cell has a Maximum Forest Cover (F_{max}) also ranging from 0 to 10. F cannot exceed F_{max}. Roads, local populations and mines reduce F_{max}. Logging directly reduces F, without affecting F_{max}. F will increase by 1 unit every turn, up to F_{max}. Plantations and sylvicultural practices will double the rate of forest growth in the cell where they are practiced. With these simple rules, we reflect the four processes of deforestation, forest degradation, forest natural growth and restoration. Biodiversity is explicitly considered in the model through the existence of noteworthy

species / unique habitats, represent by tokens located on specific cells. Each of these tokens can be in three states: intact, threatened or destroyed. Based on the land cover type of the cell it is placed on, the token will shift from one state to the other. Transitions are reversible except the last one – a species/habitat destroyed is permanently lost. Different species with different abundances are represented with specific icons on the tokens making some locations more sensitive than others.

Similar rules exist to describe demography, markets, governance and technological innovations.

Table 3: Forest Cover and the land cover typology of a cell in MineSet. The figure has been produced independently by the High Carbon Stock Steering Group. Used with permission.

	High Density Forest	Low Density Forest	Open Forest Mosaic
Forest cover	10-9	8-5	4-0
Land cover type			

RESULTS

We placed the players in a situation that would let them discover the model complexity progressively. We developed a narrative where the game begins in the 1960s. The initial landscape is completely forested with high-density forests on both sides of a single road connecting two nearby city centres. Human settlements – small holders and autochthonous communities - are present along the roadside. We distributed the players into 8 companies, 6 logging operations and 2 mining operators. We grouped players to account for their language fluency – there were French-speaking and English-speaking companies as a result. All companies had a starting capital and players were free to decide on their management objectives. After a first round of auctions for concessions among the logging companies, the teams start planning their operations, developing roads and deploying logging crews (Fig.1).

Figure 1: First instructions and initial landscape (Turn 1960). This is the landscape players begin with. All cells are connected, the gaps between cells is a simple reminder of the concession limits.

Figure 2: Negotiating access (Turn 1980). The central part of the landscape is already modified, but only the mining operations in the southernmost concession has created a visible degradation (yellow cell). The logging company where the mining operation began is proposing to co-develop infrastructures and share the costs.

Between 1960 and 1980, players expanded their road network, logging deeper in the forest. The new roads created space for settlers to move in from nearby cities. The timber collected was transported to the cities and sold to the international markets. The first impacts on the forest become quickly visible, dense forests (dark green) turning into secondary forests (light green).

The expansion of logging activities continued unabated, bringing in its wake an ever-increasing stream of migrants settling in the landscape. We represented a situation with a humanitarian crisis on the eastern border of the game, with twice as many migrants flocking into the landscape, as they escaped a conflict area (not represented in the game). Tensions started to appear, as mining operators started to secure their licenses to operate (Figure 2).

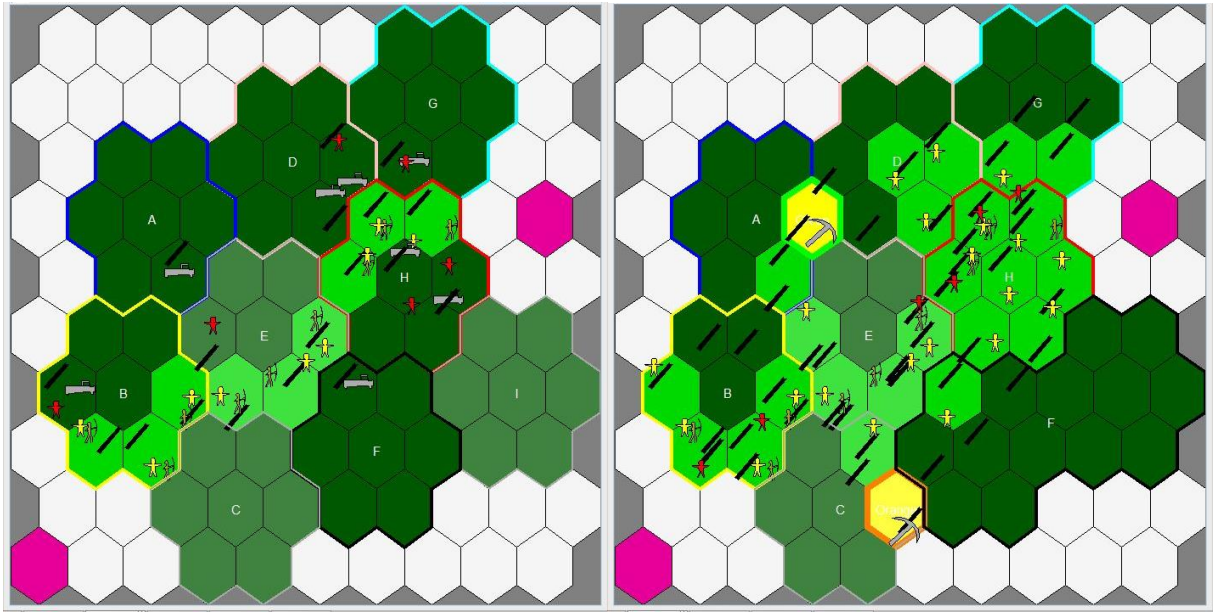


Figure 3: Initial and final landscape configuration. At the end of 4 turns (about 40 years), only one concession is free from human pressure. – through voluntary agreements by concerned players, while the rest of the landscape is heavily modified. The indirect impacts of road development and the cumulative impact of mining and logging are also visible. These maps were created in real time and integrated into the gameplay via a “national research institution” providing support and information to the players at a cost.

To engage the players further, we introduced a specific scenario: As part of an international development program, with support from the World Bank (played by the research team), the government expanded infrastructure, doubling the road network in the central axis of communication. This created opportunities for logging and mining operators (Figure 3).

Upon reaching this point, the players were in their roles, they had understood the game rules and were developing their own strategies, balancing the needs of their companies, their aspirations, and the pressures from the other players and the other stakeholders represented in the game. We then introduced in the game the BioDev 2030 project itself (renamed BiodDev 1990).

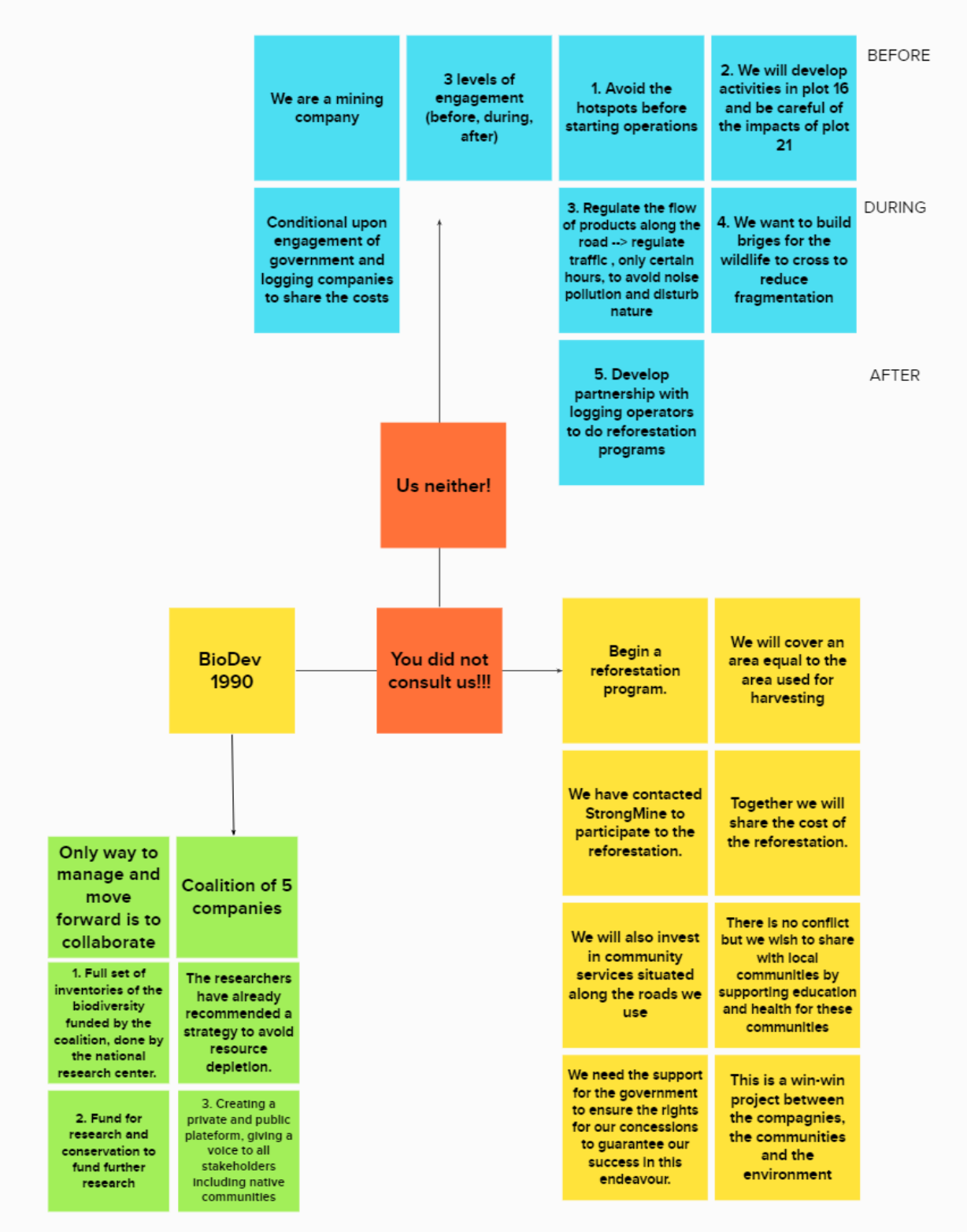


Figure 4: The nature of voluntary agreements. Three proposals were developed independently, without coordination. One relied on a strong partnership with research. The two others were conditional on government support. None addressed the core driver of landscape change and biodiversity loss.

We invited participants to negotiate voluntary agreements to bend the curve of biodiversity loss they had contributed to create in their landscape, giving them 15 minutes to organize a multi-stakeholder dialogue. The way the went about it, the role of the negotiations than happened and the end results served as the foundations of the learning process that would follow. Three groups worked in parallel, without communication and consultation. The first group involved 5 logging companies, a second was a partnership between a logging and a mining company the last one was presented by a mining company looking for partners (Figure 4).

All three present possible and plausible voluntary agreements that could emerge in a pilot country. The first proposal involved a strong backing with research institutions but did not detail the commitment beyond funding the research and a commitment to sustainable logging operations. The second one presented a commitment to restore landscape through co-funding, and investing in community and livelihood programs. The third one proposed a phased approach, involving better planning, reduced impact operations and restoration programs. The last two proposals were made conditional on the engagement of the government to support their operations. None of the proposal addressed the root cause of biodiversity loss, nor took stock of the magnitude of the impact on the landscape. For lack of time, we did not to play out the impact of these commitments on the dynamics of the game, deciding instead to engage in the debriefing.

The impact of on the forest cover at the landscape scale was monitored by adding the values of forest cover of all the cells in the landscape. The distinction between F_{max} and F lets us disentangle the impacts of deforestation (Total F_{max}) and deforestation + degradation (Total F). The accumulation of logging activities, road development and small-scale agriculture by local populations continuously reduced the forest cover in the landscape over the rounds (Figure 5)

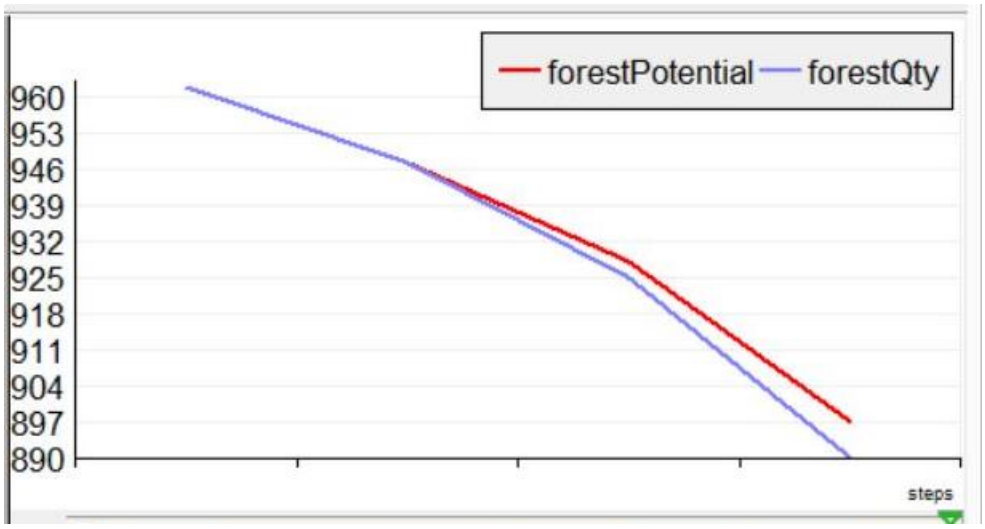


Figure 5: Evolution of the forest cover showing deforestation (Red line, forestPotential - F_{max}). and the cumulative deforestation and degradation (blue line, forestQty, F); The development project and the doubling of infrastructures caused the increase in deforestation in the last round.

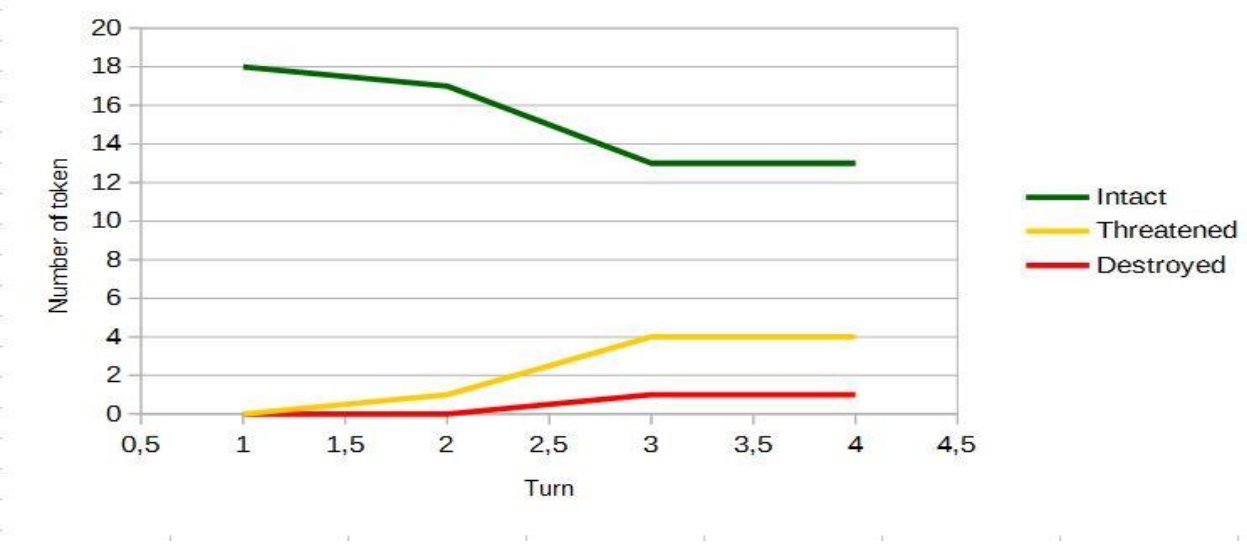


Figure 6: Evolution of critical habitats. Total number of critical habitats (18) and evolution of their status. The threatened habitats can be recovered, not the destroyed ones.

Many indicators can be followed – the volumes traded, the evolution of the number of critical habitats (Figure 6) and other landscape metrics. All these were part of the discussion that followed the session. We presented these indicators to the players ending with an observation: in view of the magnitude of their impact on the landscape and on the pressure on biodiversity, would their commitments have any impact? (Figure 7)

Figure 7: Down to earth. After the players presented their voluntary agreements, we revealed their real impact on the landscape. In view of the trends of deforestation, forest degradation and biodiversity loss, we invited them to have a critical feedback on their commitments.

DEBRIEFING

Learning begins when the game is over[2] (3, 4). This sentence, coined by David Crookall, professor at the University of Nice Sophia Antipolis, expresses the fact that the interest of the game lies the discussions that it will generate during and after the game session. Participants generated outcome statements, lessons taken and suggestions for the next steps.

Participants were asked to identify the bottlenecks preventing better decision making (Table 4). In a second phase they were invited to identify which ones of these bottlenecks were also found in their respective landscapes. With 3 exceptions (one being the difficulty to understand the rules of the game), all these bottlenecks are found in at least one landscape, and some are common (difficult access to scientific information, lack of government transparency, lack of incentives and treasury problems) to very common (no communication between parties, no arguments for sustainability, conflicts of interests).

Table 4: Bottlenecks preventing coordinated actions across the landscape.

Bottleneck	Statements	Frequency	Sub total
No common agenda	Conflicts of interests	11	**26**
	No common agenda	5	
	Divergent interests	3	
	Conflicts between different strategies	3	
	Incompatible production modalities	2	
	Narrow self-interest dominates	1	
	Lack of understanding about the interests of the other parties	-	
Business bottlenecks	Lack of incentives	7	**24**
	Lack of treasury	7	
	Lack of financial capacity	5	
	Lack of time	3	
	Difficult access to credit	1	
	Lack of legal security	1	
	Unequal risks across sectors	-	
Lack of coordination	Lack of communication across companies	9	**14**
	No platform to discuss at the national level	4	
	No shared desire to find solutions	1	
Lack of government capacities	Lack of transparency from the ministries	5	**12**
	Inability to give visibility and commit	3	
	Lack of infrastructure and investment	2	
	No fiscal incentives	1	
	Lack of political will	1	
Difficulty to plan	Lack of arguments for sustainability	9	**10**
	Lack of anticipation	1	
	Complexity of the rules	-	
Lack of Information	Access to scientific information	8	10
	Access to information on regulations	2	

[2] This statement initially formulated by David Crookall, professor at the University of Nice Sophia Antipolis, is now the title of a paper we have published explaining the use of games for learning. https://doi.org/10.14512/gaia.25.4.13

The similarity between the experiences the participants report from the field and what they experience through the game serves as validation of the model to represent real life negotiations about the landscape governance. Only one point was identified as missing, the stakeholders that are not at the table – the missing players, so to speak. We would like to point out that in the game they are effectively represented but are effectively silent, until someone gives them a voice: here the local communities, the migrants and the autochthonous communities. If the problems faced in the game are similar to the problems BioDev 2030 faces in the field, what lessons can be taken from the experience? (Figure 8).

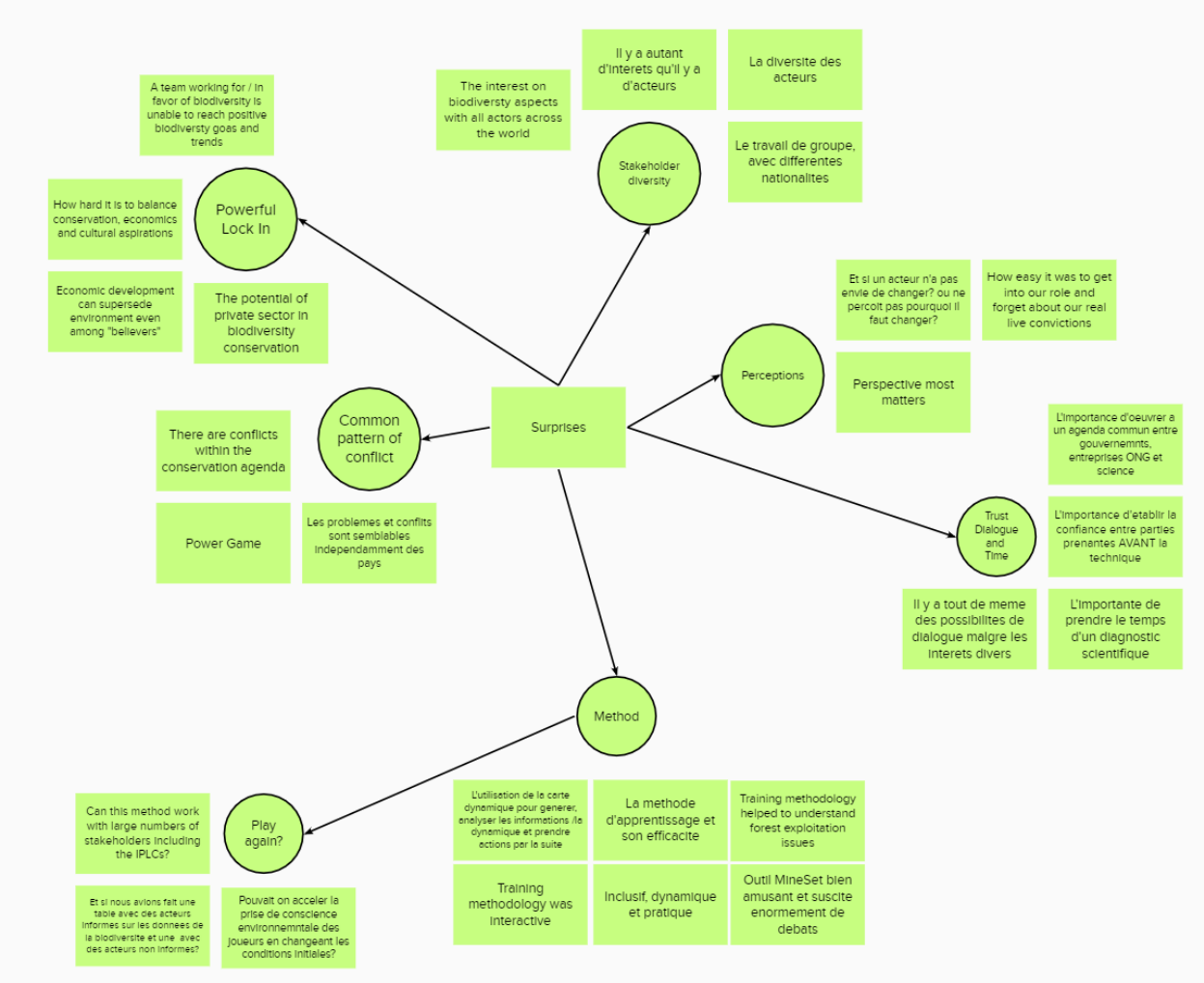


Figure 8: Surprises. What are the striking features of the day session? Participants were taken aback by the powerful lock in, by the similarities between the conflicts represented in the game and what they are familiar with, by the diversity of stakeholders and points of view, by the importance of perceptions, by how critical is dialogue and the time to listen and understand. They were also surprised by the power of the game to generate insights, and had questions regarding how to play again or differently.

LESSONS TAKEN

"**The decisions we took are not enough to reverse the trend**". This statement sums up the collective understanding of the agreements designed in the trial: Participants were then invited to reflect on how to improve the impact of the agreements they had developed build during the game. Their proposals map out across the 10 principles for landscape approaches as defined by Sayer et al 2012, a point explicitly mentioned by the only other statements we cannot classify here: "**Follow landscape integrative approach".** (Table 5) These principles emphasize adaptive management, stakeholder involvement, and multiple objectives.

Table 5: How to improve the impact of the agreements? The suggestions made by the participants map out across the 10 principles of landscape approaches. (Sayer et al 2013)

Principle	Statement
1 - Continual learning and adaptive management	Scientific evidence of baseline Analyse our behaviour Understanding what biodiversity is Changing the way we act on the landscape
2 - Common concern entry point	Agree on a common agenda Define a common interest for landscape conservation
3 - Multiple scales	Time frames (long term commitment) Reduce impact by 2030 and restore by 2050 Collaboration across scales
4 - Multifunctionality	We need to include all supply chain in Consumers and markets are lever of change Investment in reforestation
5 - Multiple stakeholders	Support local NGO Involve native communities
6 - Negotiated and transparent change logic	Define clear action and time frames Demonstrate investing in biodiversity is also a win
7 - Clarification of rights and responsibilities	Government should be involved as much as possible Support of Government is needed Clarity in government regulations
8 - Participatory and user-friendly monitoring	Local observatories Monitor change Integrate native communities' knowledge
9 - Resilience	Consider the ecosystems and species components Focus on transformation not only compensation Compensating vs changing how we do things
10 - Strengthened stakeholder capacity	Reinforce regulatory processes Companies have little time Share of resources Seek alternative sources of energy

Following these, we asked participants to share what next steps they would like BioDev 2030 to take. These fall under 6 main topics, that can we mapped out as follows (Figure 9):

1. Develop better **stakeholder mapping** in the pilot sites, gathering intelligence to better understand the diversity of perceptions.
2. **Foster dialogues**, with a more proactive approach towards the stakeholders the project expects to influence.
3. Strengthen the capacity of the BioDev 2030 team to conduct this sort of dialogues in their respective countries.
4. Deploy the game method, maybe even MineSet as a way to engage the stakeholders.
5. Develop awareness creation on the role of biodiversity – for those stakeholders that are still uninformed.
6. Develop better advocacy on the role of biodiversity and the possible synergies. This last point could be developed through the analysis of what works and what does not during the game of MineSet, as pointed out in the final segment of the workshop.

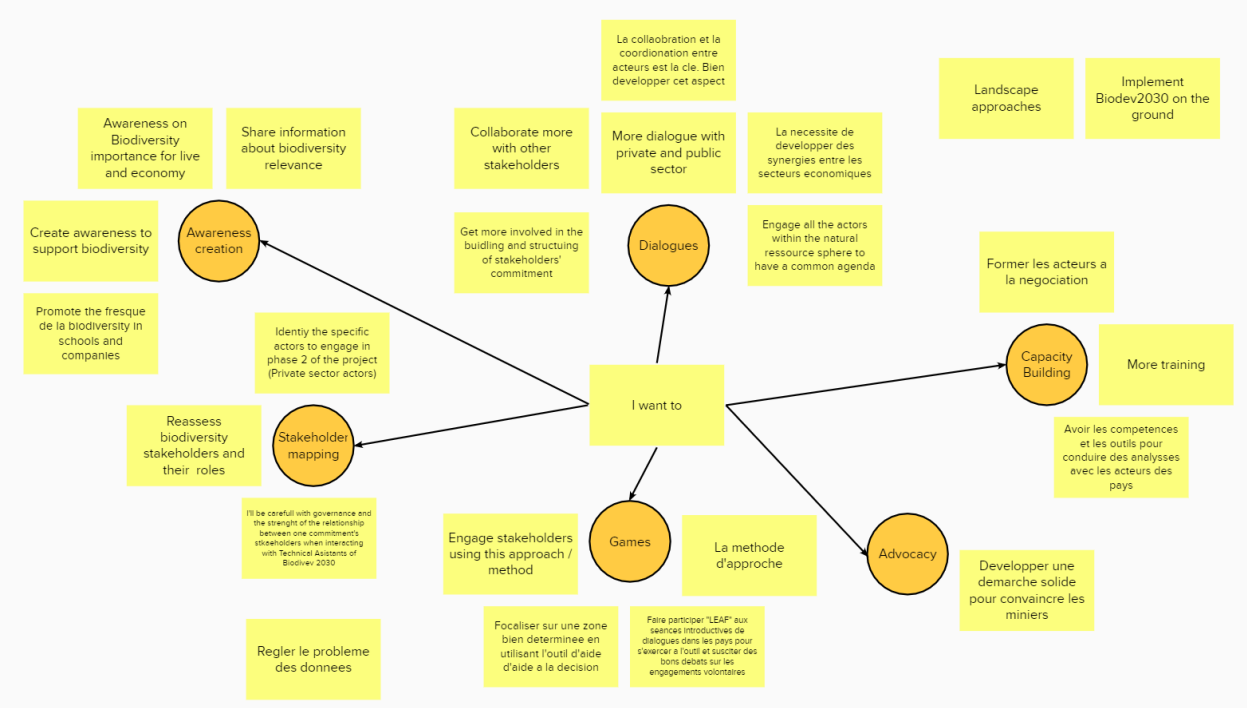


Figure 9: Next steps. Participants evoked a variety of aspirations about the next steps BioDev 2030 could take, from stakeholder mapping exercises to capacity building and the use of the same games in their geographies.

In addition to the session report, we propose in appendix 2, answers to some of the most common questions that surface when we present our approach.

WORKSHOP EVALUATION

The final event of the day was to elicit feedback on the workshop itself. We asked participants on their way out to assess their satisfaction in terms of content - the issues covered in the discussions) and form – the way in which the content had been delivered. The results indicate outstanding satisfaction in terms of form and good satisfaction in terms of content.

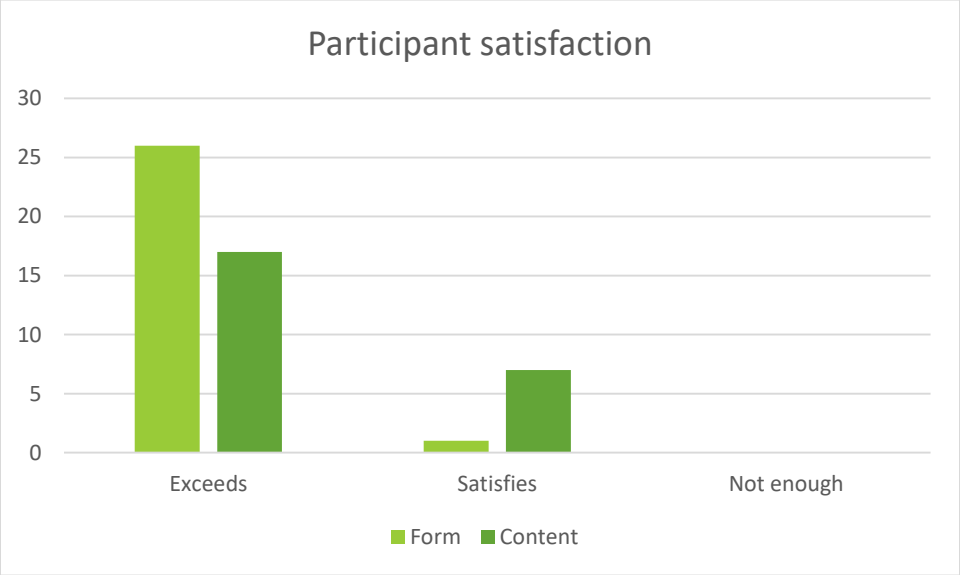


Figure 9: Participant satisfaction. The only margin of progression seems to have been more time to discuss some of the many topics uncovered during the debriefing.

CONCLUSION

Gamification, the introduction of elements of play in everyday life, has gained traction in management sciences – as a way to lure participants to achieve pre-defined objectives. What BioDev 2030 invited the participants to do is radically different. We brought real life issues to the universe of gaming, as a way to better address these realities. We empower participants and help them become better strategists:

- Participants realised the decisions they took, when negotiating a voluntary biodiversity agreement, were not enough to reverse declining biodiversity trend.
- Solutions identified to improve the impact of the agreements map out across the 10 principles for landscape approaches as defined by Sayer et al 2012. This provides a sound methodological basis to support the national dialogues.
- Key next steps identified are to: develop better stakeholder mapping, foster dialogue with priority stakeholders, and communicate information on biodiversity business case.

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APPENDIX 1 - PARTICIPANTS

Table 1: Participants of the BioDev 2030 workshop

NAME	INSTITUTION	JOB DESCRIPTION

Table 2: Facilitators

NAME	INSTITUTIONS	ROLE
C. Garcia	LEAF, BFH, ETHZ	Game Master
J. Garcia-Ulloa	LEAF, Biovision	Game Master
J. Chupin	JC	Ministry of Mines
H. Dessard	CIRAD	Ministry of Forests
A. Bommel	CIRAD	Research Institution
P. Bommel	CIRAD	Research Institution
A. Fellay	LEAF	Observer
F. Quetier	Biotope	Observer

APPENDIX 2 – FREQUENTLY ASKED QUESTIONS

In addition to the session report, we propose the following section that answers some of the most common questions that surface when we present our approach.

How realistic is the game?

The question of realism in a modelling is not new, and was already discussed in Levin's seminal paper about the strategy of model building (Levin 1959). When discussing a model's "realism", we need to clarify if we mean that the model describes with accuracy the causal links between system components, or if we mean the outputs of the model accurately describe real life outcomes (5). If the meaning of the question is the second one, then our games are not realistic. The landscape we create is only an allegory of the real landscape of Central Africa. However, if the meaning of realism is the first one, a match between the causal structure of the world and that of the model, then, according to the statements of the participants themselves, "*all interactions in the game we see also in real life".*

Realism seems a desirable attribute for any model designed to help decision-making. However, the major difficulty when dealing with wicked problems lies not in understanding the bio-physical processes involved, but rather the values held by the various stakeholders, their segmented perception of the system, and their agendas, that at times appear to conflict, at other times genuinely do so (6). Thus, what matters with our games is to represent the stakeholders and their power and knowledge asymmetries. Precisely because a game session involves people, two major components of decision-making are constitutive to the model: 1. bounded rationality, i.e., the fact that a human is not a rational *homo economicus*, and 2. behavioural plasticity, i.e., the fact that we learn, cope and adapt when receiving feedback. Our games thus offer a realistic representation of the social component of any natural resources management problem. One that is notoriously difficult to capture in a classical model with standard approaches.

How do we know the behaviour in the game is real?

This question really means: "Do players exhibit the same behaviours than stakeholders outside of the game room". Developing and using games that trigger realistic behaviour in participants seems crucial for both increasing our understanding of how the system at hand works as well reaching real change in stakeholders' perceptions and actions. Many authors have described the strong relationship between game and participants real life (7-9). This is connected to the previous question, "how realistic is the game?".

There are several ways to assess how realistic is the behaviour participants exhibited during game sessions. A debriefing session after a game is an essential step to discuss the dynamics during the game and how these dynamics relate to real life. Participants sharing their views and experiences from the game and reality, allows grasping how realistic the behaviour of the

participants during the game was. Additional individual interviews after the game session allow discussing more in-depth how the dynamics in the game relate to real life. This will enable triangulation of the observations made during the game session.

But maybe this question is not that relevant. What does it matter if players act in the game in ways they would never do in the field? This is precisely what we seek to achieve after all, innovation and the exploration of possible futures beyond what we think can happen.

How easy it is to get people to the table?

As with many new methods and approaches, people need to trust that the new approach renders better results than the more conventional methods. In addition, as we will discuss later, games are seen as “not serious enough”. The weakness of the approach is at the same time one of its strengths. The fact that a game setting is regarded as a not so serious and fictional makes it easy to interact and discuss issues in an open manner. We take people away from a situation of conflict to explore possible new ways of resolving it.

Starting the Companion Modelling process with a group of key stakeholders who have leading roles in their communities or associations will facilitate and strengthen the belief in the new method. Difficulties of getting stakeholders to participate in game sessions have nonetheless been encountered and described by several authors (9-12). Therefore, in addition to a starting with a group of influential stakeholders, we recommend the use of the (i) snowballing method to decrease levels of absenteeism among invited participants and increase active participation during the game, or (ii) use an open informal invitation to all members of the community (12). In both cases, participants who actually show up can be grouped randomly, by ages, by roles or any other reasonable scheme.

How seriously do people take it?

Our games are fun! The fact that people can forget their daily problems and immerse themselves completely in the world proposed by the game is what makes such a powerful engagement tool. If the game session also involves lightness and laughter, participants continue to discuss the topics long after the session finished. A game will create a powerful emotional imprint on the participants, making it possible for them to refer back to what happened during the game weeks after the session. This is linked to the emotional responses players undergo when playing – beyond the rational and logic design of strategies, surprises, frustration and triumph, anger and joy, all can be experienced through a well-designed and well-run game session.

Yet learning through games is frequently regarded as not serious enough by the layperson. Reputational risks, difficulties to justify to superiors, donors and the taxpayer the allocation of time and resources, or other cultural barriers preventing adults from playing should not be underestimated. The use of “serious games” can be understood as a way to circumvent these

barriers. Avoiding the term “game” altogether is often suggested as another approach – participatory exercises, scenario exploration focus groups, participatory modelling workshops… Some of us see this as self-defeating. This undermines the mental disposition we seek to induce in the participants – creativity, collaboration, trust. Our games are games and they are fun.

Participants on the other hand generally take our games very seriously, particularly if the debriefing is well conducted. A clear sign of this is the frequent and extent of in-depth discussions on topics, issues and elements that are not part of the game, but were issues from real life discussed through the game (9). The often-vivid discussions during the game and the debriefing shows that the participants take these games very seriously.

What does it change?

The ultimate goal is to help people make more informed decisions about natural resources management. To reach this objective, we often take a two-step approach. The first one is to understand the processes at play, the second to actually support the collective decision-making. No new knowledge will typically be created while the first objective is pursued, but the existing and often fragmented knowledge will be assembled and made explicit. ComMod generates models that are a collective mind map of the state of the art on the issue explored. These models say: “This is how we understand things to change. This is how we see the state of affairs of the world”. Such a proposition in itself will already be useful to the stakeholders. It is also a powerful way to identify knowledge gaps and define avenues for further research.

But that comprehensive understanding is generally not what is expected when we ask the question of the impact of our games. The question seeks to hear about tangible changes the method generated. Truth be told, this is difficult to demonstrate. Participants report they had fun and learnt new things about the system, about themselves and about the others. We can communicate these statements and the behaviour exhibited during gaming sessions. We can also report the discussions held after the games. So what?

Here we are confronted to the same problem that all research institutions face when exhorted to demonstrate impact. Changes in the world have multiple, complex and often cryptic causes. It is a rare occurrence when a policy decision mentions the scientific paper that sparked the debate and even then, it might happen years after publication. More importantly, the outcomes ComMod generates often are not quantifiable or divisible. Attribution then is nonsensical. Using methods derived from Outcome Mapping and Harvesting, we are slowly building a library of “success stories”, where tangible change –new contracts, new policies, new infrastructures or new practices – can be credibly linked to ComMod and the game sessions.

The key to impact rests in who gets to play. There are three pathways of change when we develop a process. The first involves the core group of leaders, agents of change and facilitators engaged in the process of designing the model and the game. In the process, they will gain in depth

understanding of the complexity of the processes they are modelling and of the actors involved. The changes will be profound, but this kernel is small - 5 to 10 people, often not more. The second pathway flows through the learning process of the participants to the games. More games, more players. Learning will happen, but the transformation will be less than for those engaged in the first pathway. The participants of the BioDev 2030 workshop are part of a cohort, and it would be possible to see if their practices and approaches to problems differ after the ideas that were discussed during and after the game. Finally, the third is the audience that listens to the narratives developed about our games. This is virtually global, but with the least transformational capacity. Game behaviour is not actual behaviour and internal validity does not translate into external validity. In addition, as we discussed, the cultural barriers will play here again, creating scepticism when we report findings.

Deciding whom to work with – transdisciplinarity - , whom to play with – engagement – and whom to talk to – monitoring – are the three critical questions to address when contemplating to use games to bring about change in a system.