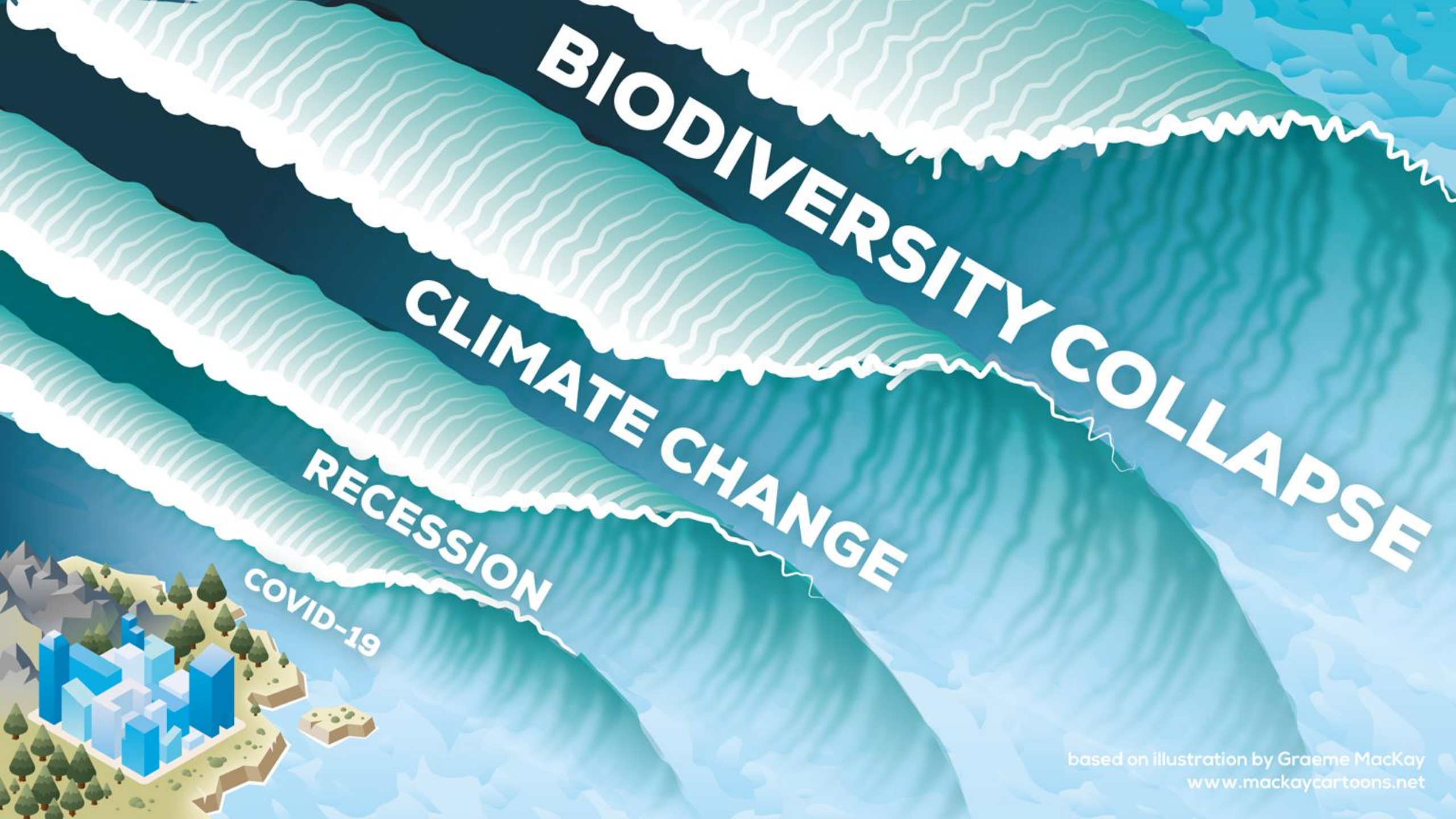
Real People as Agents in Social Simulations

a review of prototypes and emerging hypotheses

Piotr Magnuszewski

Centre for Systems Solutions


BIODIVERSITY COLLAPSE
CLIMATE CHANGE
RECESSION
COVID-19
based on illustration by Graeme MacKay
www.mackaycartoons.net

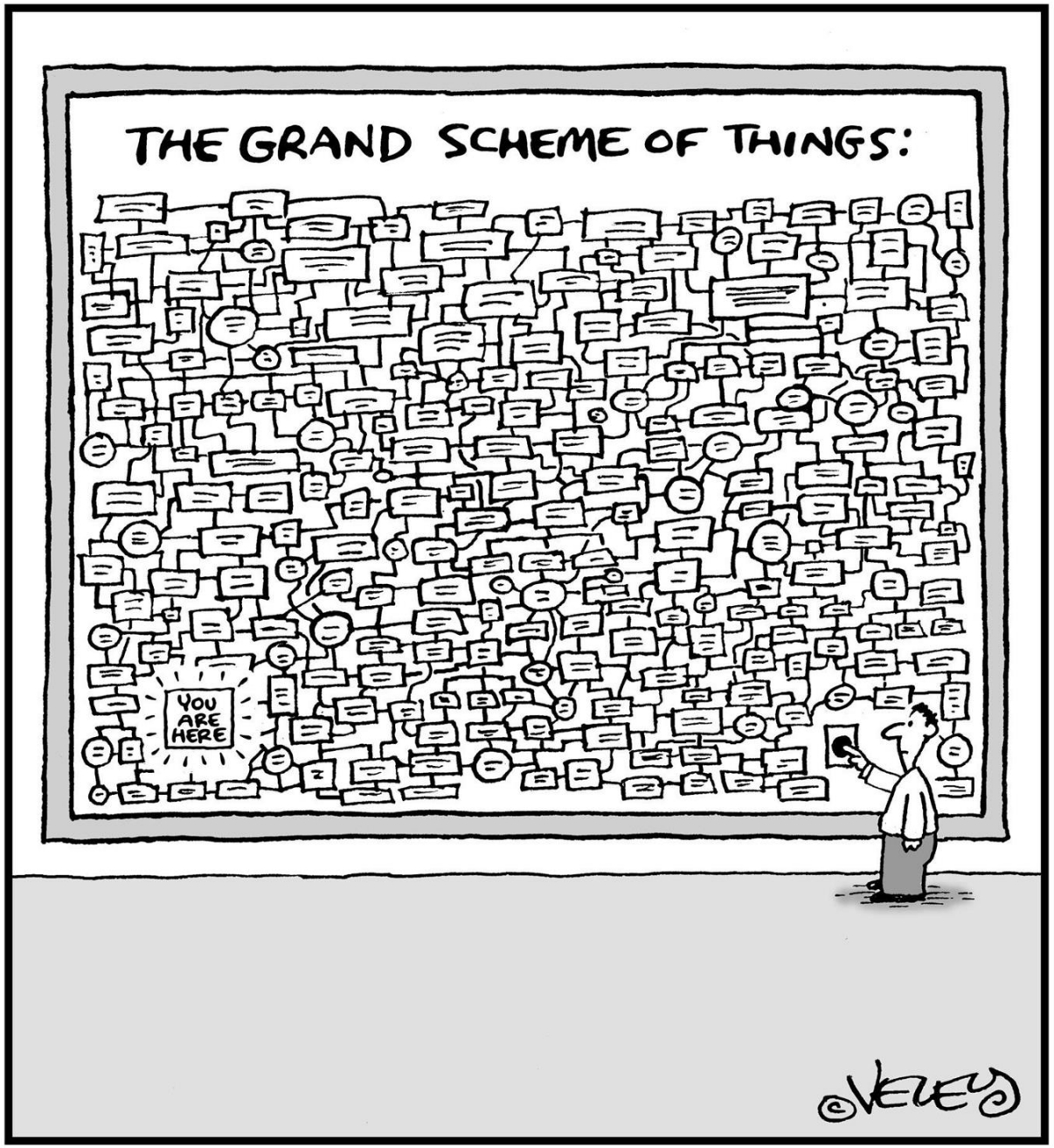

COMPLEXITY

UNCERTAINTY


AMBIGUITY


I'M SURE GLAD
THE HOLE ISN'T
IN OUR END

How to work with



Bradford Veley/CartoonCollections.com

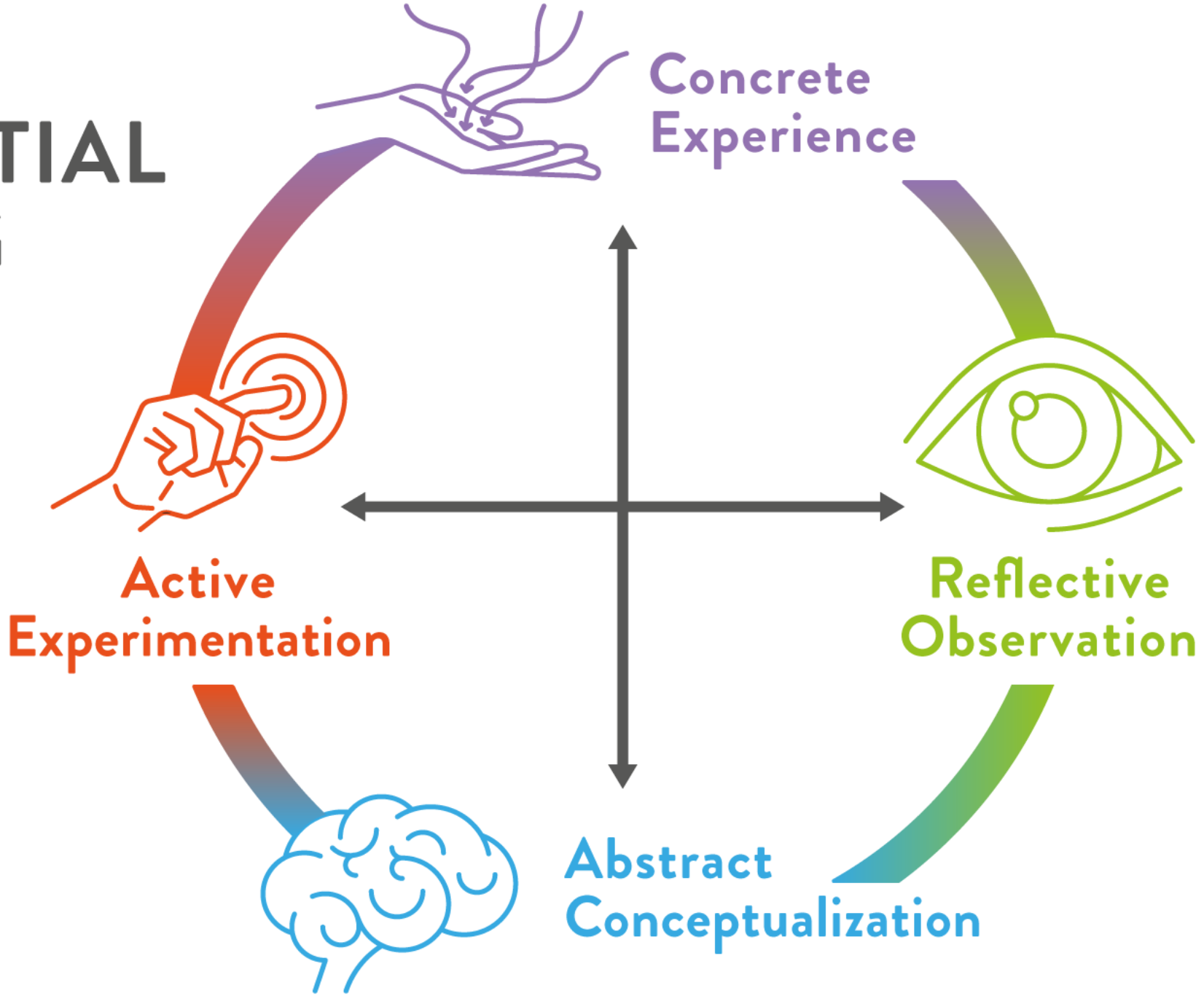
COMPLEXITY?

"Here's where you give me non-comprehending nods of approval."

How to bridge Science to Policy and to Society?

EXPERIENTIAL LEARNING

David Kolb



MAGAZINE SPRING 2001

Decision Making: It's Not What You Think

Henry Mintzberg and Frances Westley • April 15, 2001

Mintzberg, H., & Westley, F. (2001). It's not what you think. *MIT Sloan Management Review*, *42*(3), 89-93.

Different Approaches to Decision-making

„Thinking first"

features the qualities of

science

planning, programming

the verbal

facts

„Seeing first"

features the qualities of

art

visioning, imagining

the visual

ideas

„Doing first"

features the qualities of

craft

venturing, learning

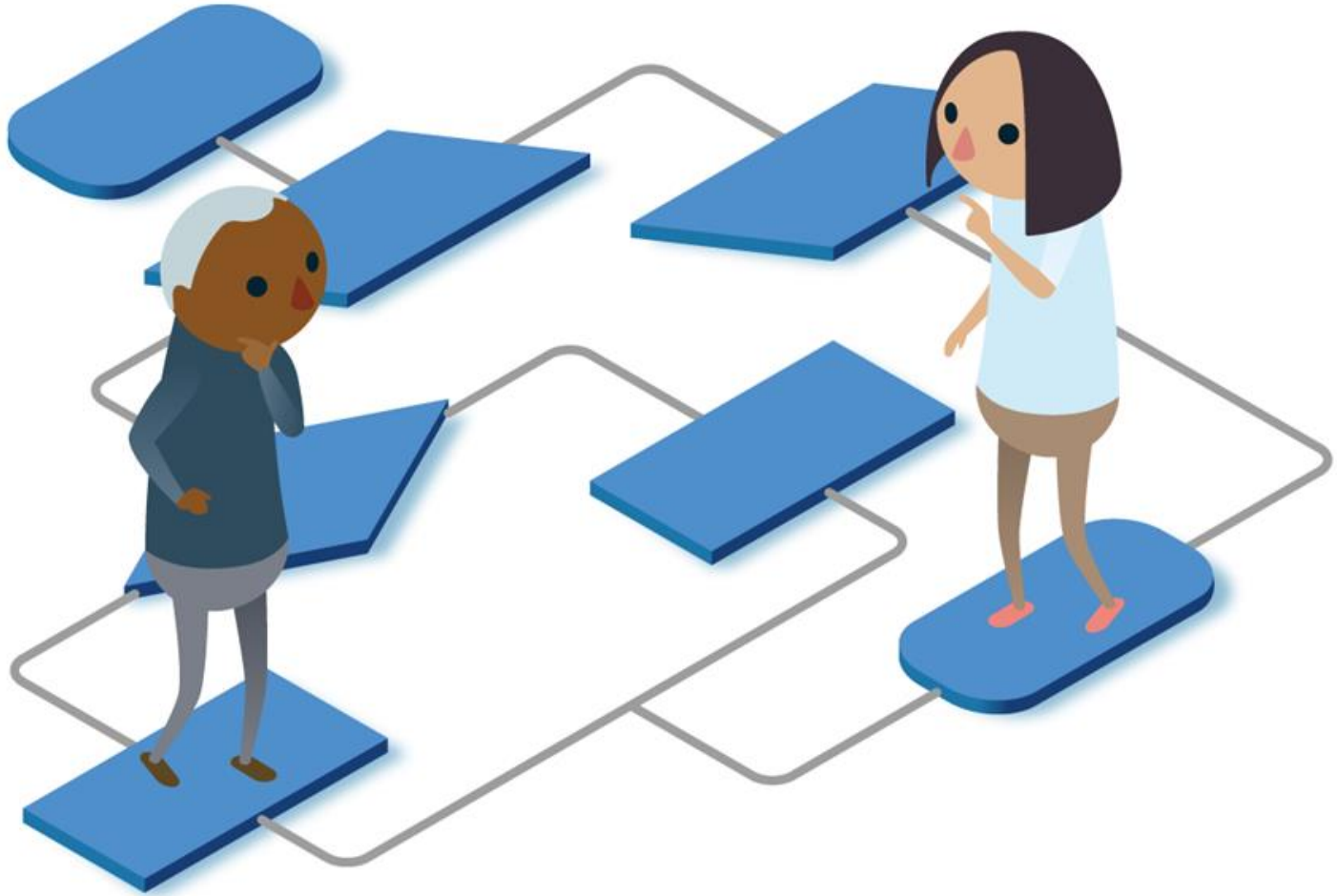
the visceral

experiences

Mintzberg, H., & Westley, F. (2001). It's not what you think. *MIT Sloan Management Review*, *42*(3), 89-93.

Bridging the Gap

REFLEXIVE & CONCEPTUAL

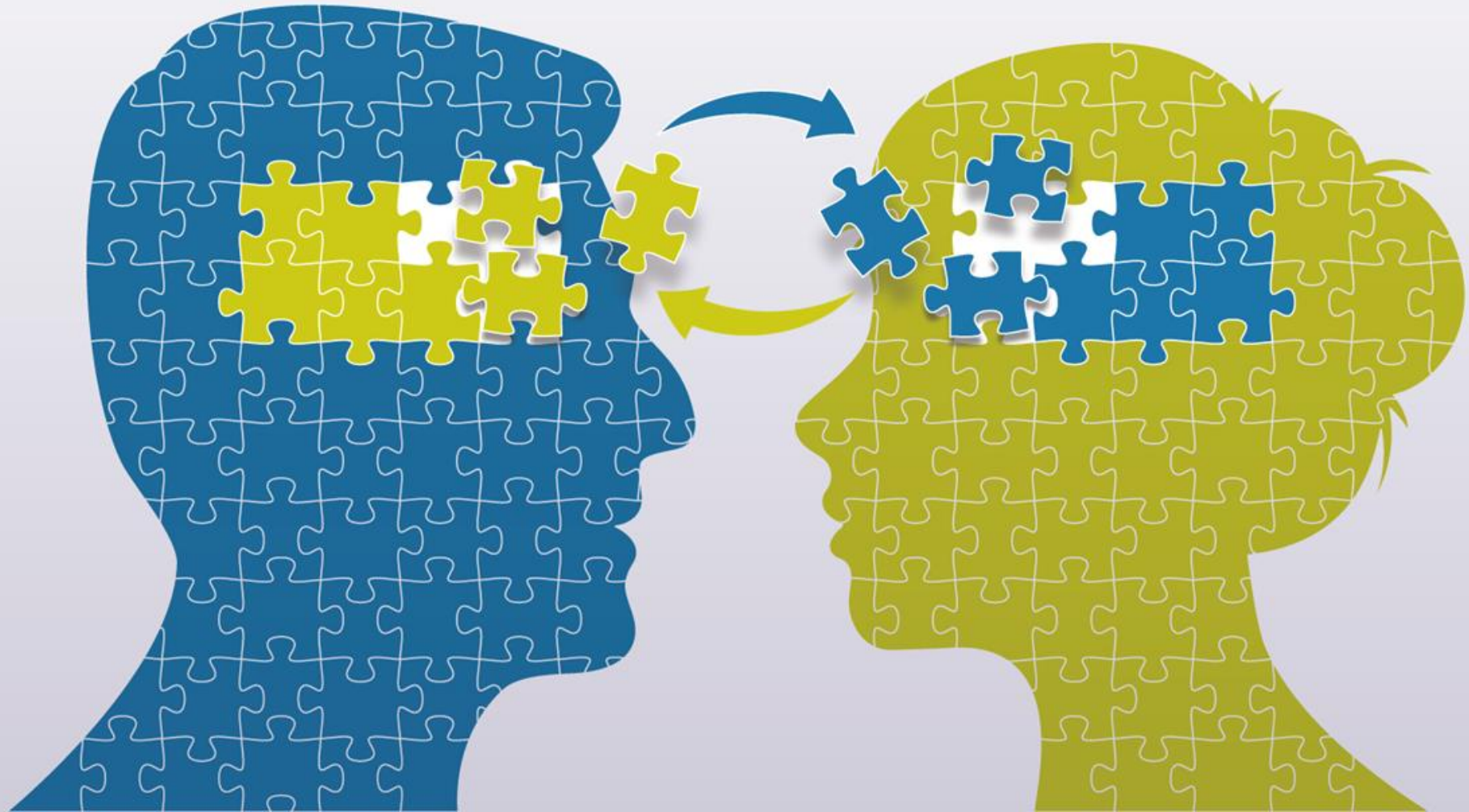


ACTIVE & EXPERIENTIAL

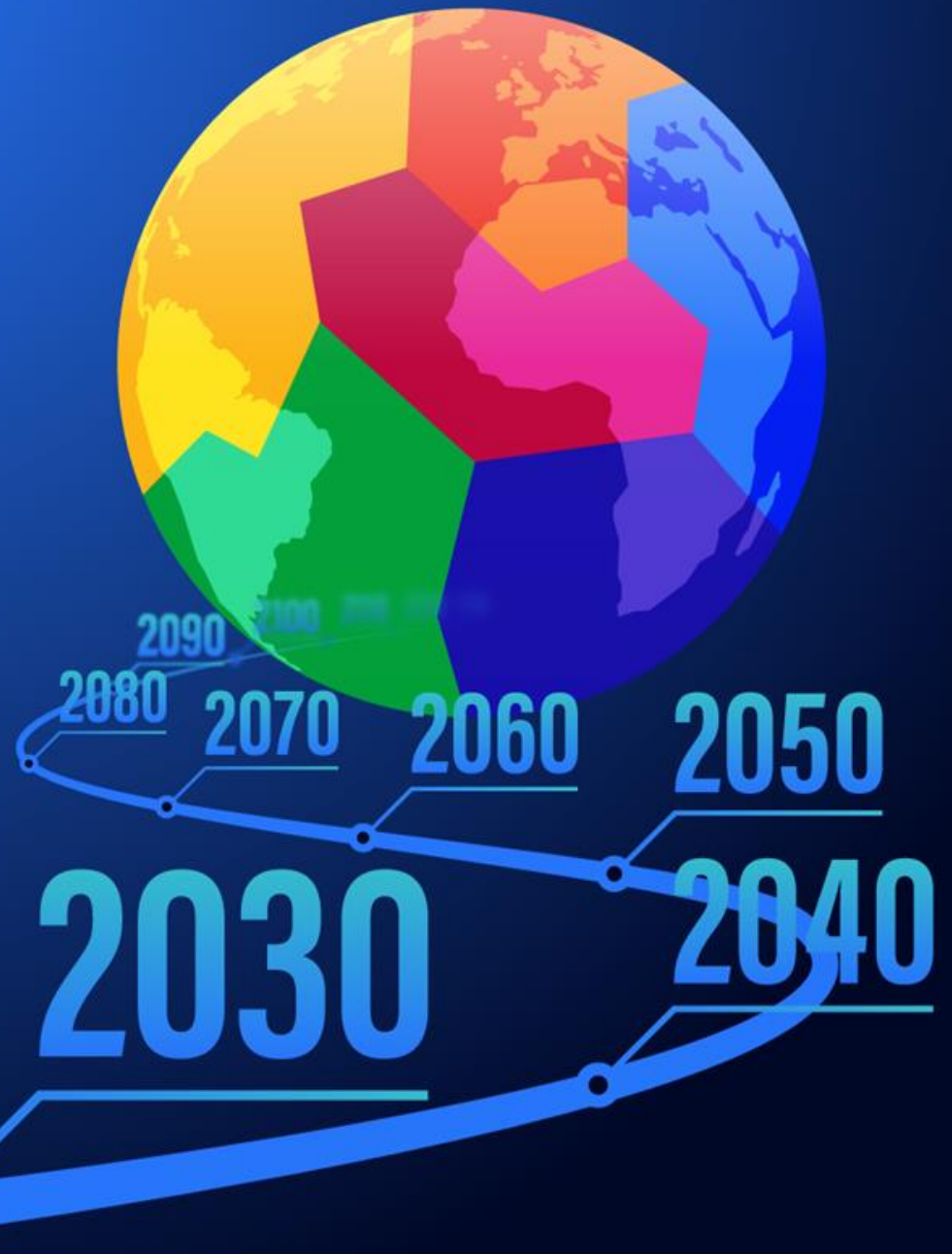
PROBLEM-ORIENTED

PEOPLE-ORIENTED

Communication & Collaboration



FUTURE-ORIENTED



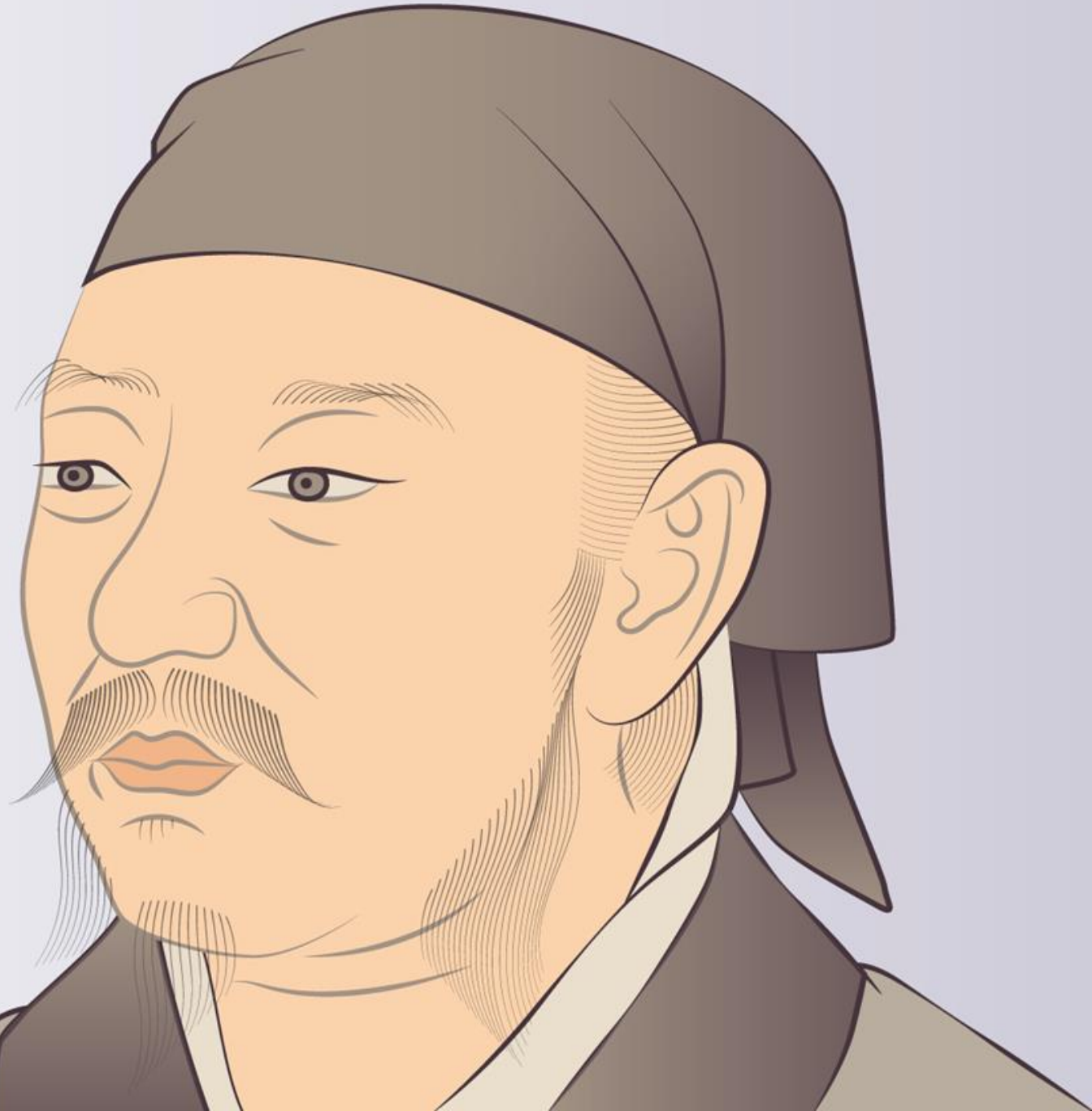

SOCIAL SIMULATIONS
GAMEFLOW
1→2→3→4
BREAKING NEWS
LIVE
19:01
SOCIAL MEDIA
PATHWAYS
ROLES & BACKSTORIES
CRISIS
§
DECISIONS
A
B
C

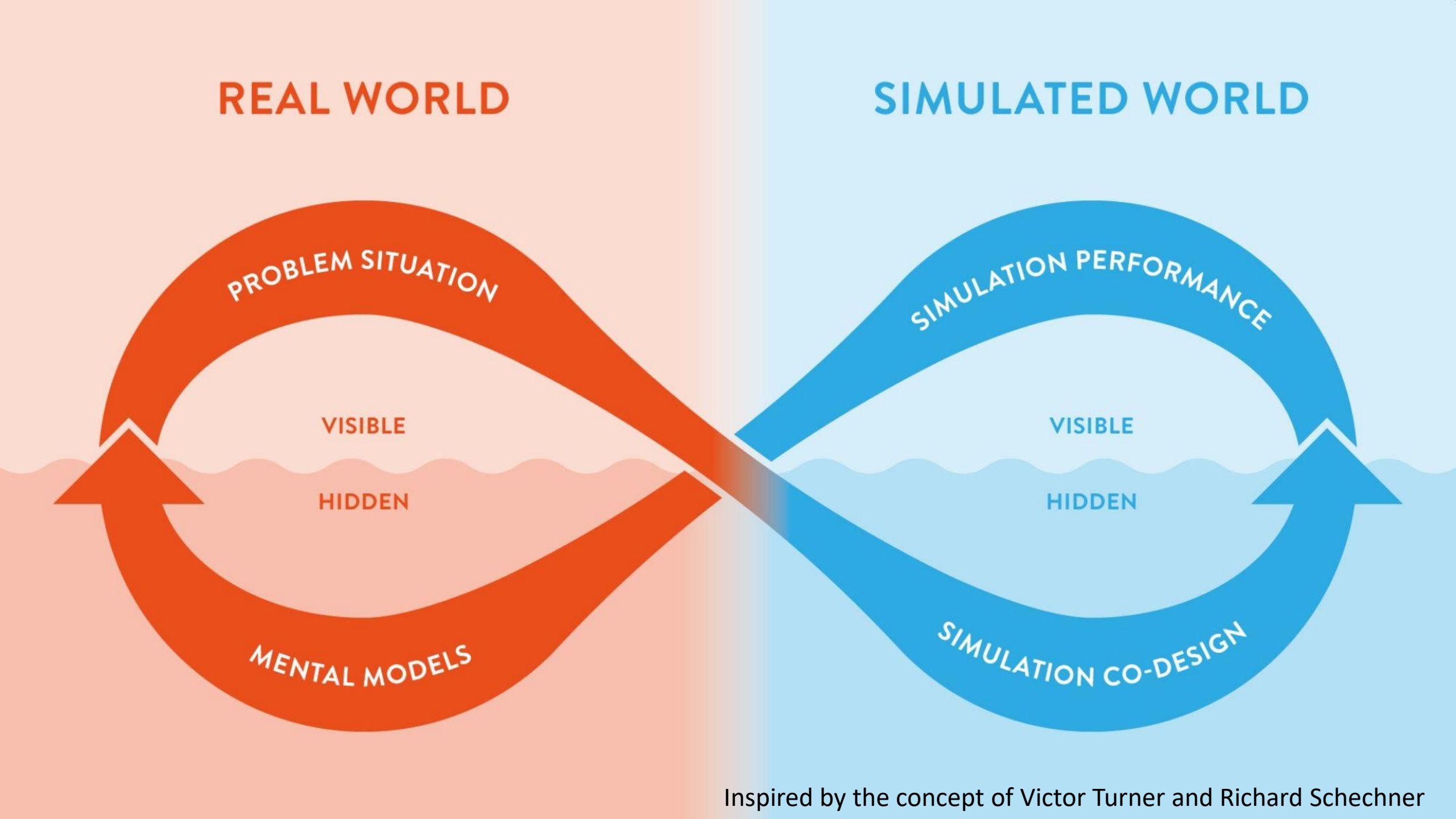
Tell me and I forget,

Show me and
I may remember,

Engage me and
I will understand.

Xunzi





Inspired by the concept of Victor Turner and Richard Schechner

1. REAL-WORLD PROBLEM SITUATION

2. SIMULATION CO-DESIGN

3. SIMULATION PERFORMANCE

4. DEBRIEFING

5. STAKEHOLDERS' DIALOGUE

1. REAL-WORLD PROBLEM SITUATION


1. REAL-WORLD PROBLEM SITUATION
?
TIMELINE
SOCIAL SIMULATIONS
LIVE

SOCIAL SIMULATION DESIGN AND APPLICATION FRAMEWORK

REAL-WORLD

SIMULATED WORLD

Actions

VISIBLE

HIDDEN

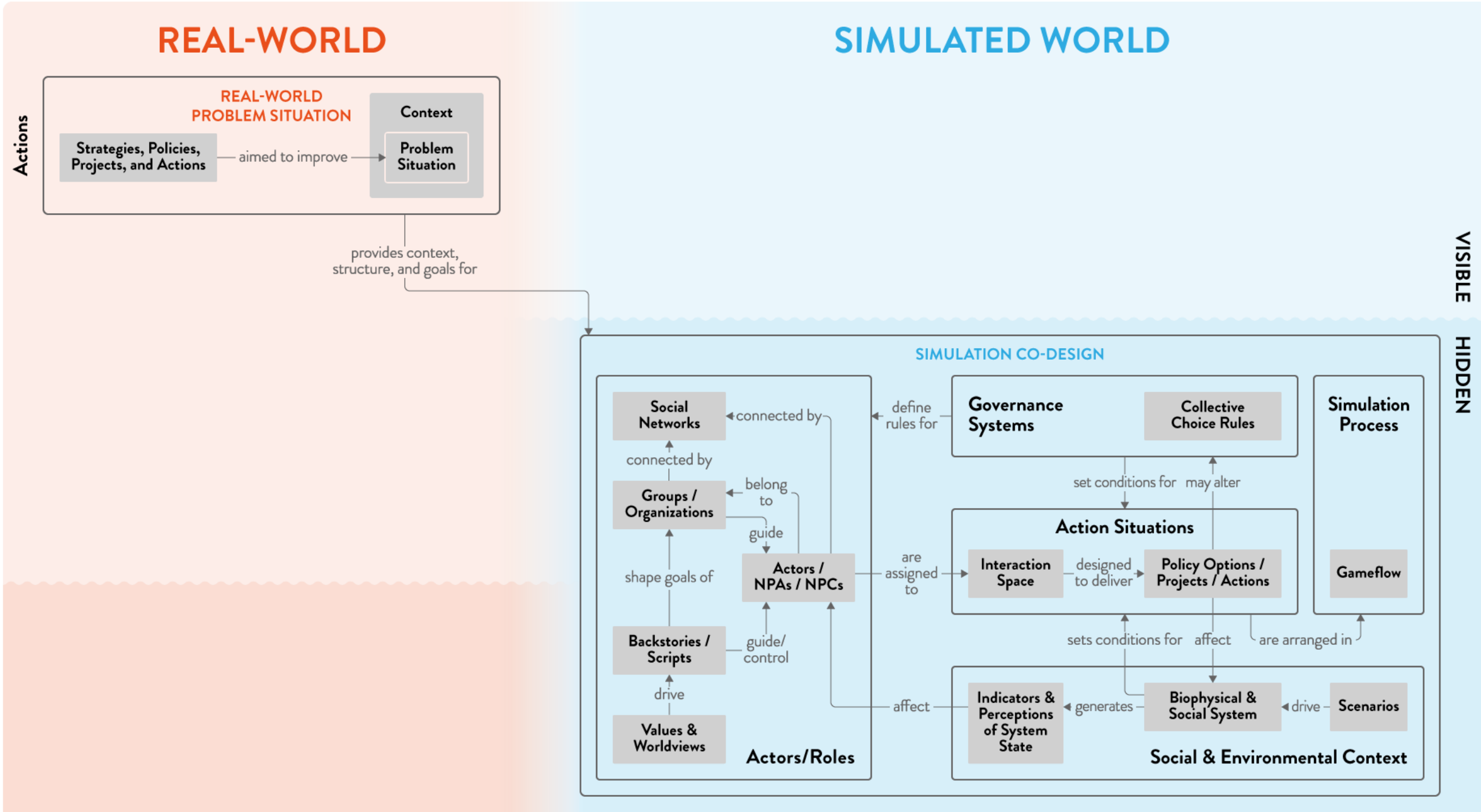
EXAMPLE:

https://www.youtube.com/watch?v=9R9RNQ3ROrg&ab_channel=CentreforSystemsSolutions

2. SIMULATION CO-DESIGN


2. SIMULATION CO-DESIGN
SOCIAL SIMULATIONS
TIMELINE
CRISIS
ACTIONS
OUTCOMES
§?
A
B
C
W
X
Y
Z
ROLES & BACKSTORIES

SOCIAL SIMULATION DESIGN AND APPLICATION FRAMEWORK



McGinnis, M. D., and E. Ostrom. 2014. Social-ecological system framework: initial changes and continuing challenges. *Ecology and Society* **19**(2): 30. http://dx.doi.org/10.5751/ES-06387-190230

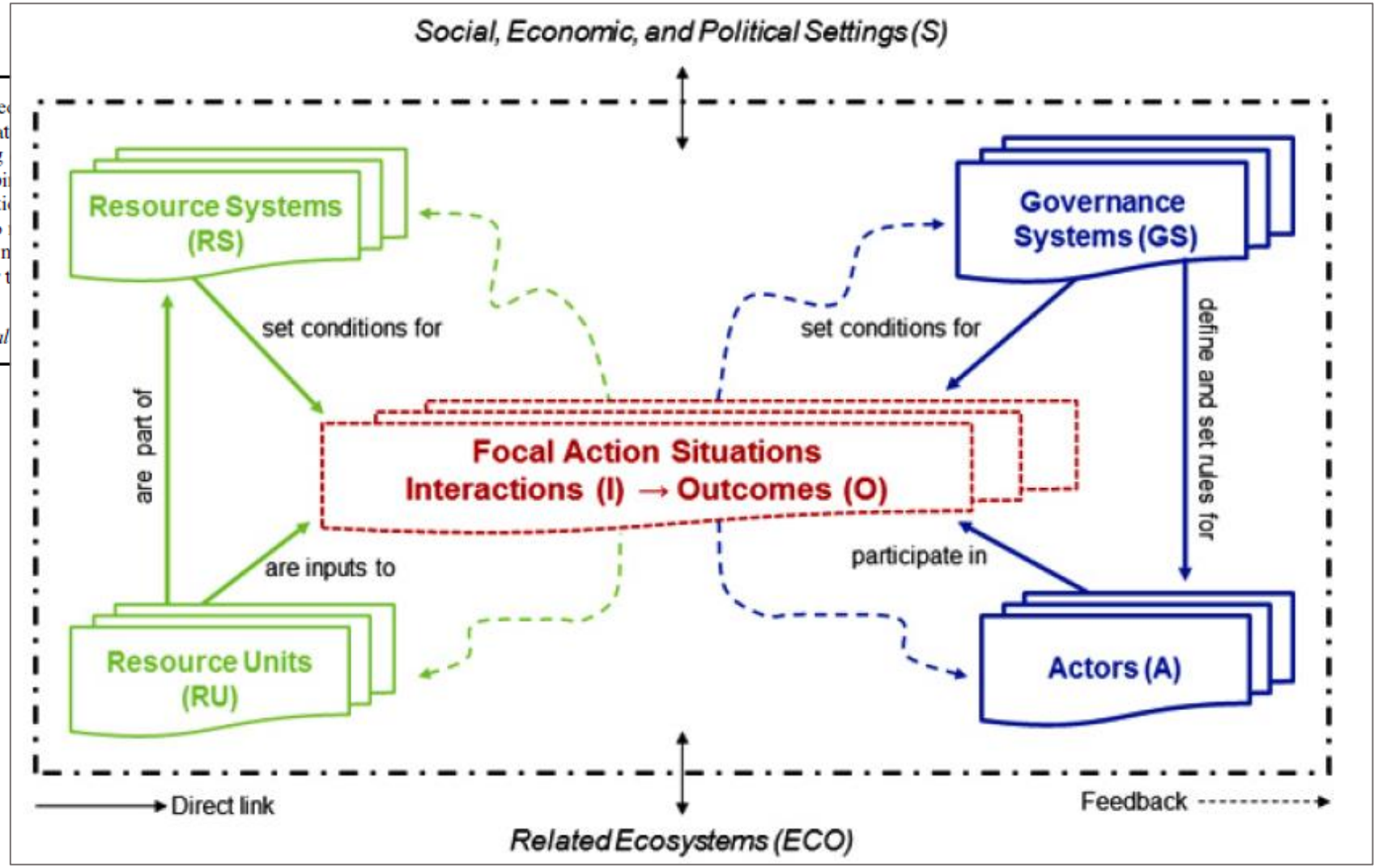
Insight, part of a Special Feature on A Framework for Analyzing, Comparing, and Diagnosing Social-Ecological Systems

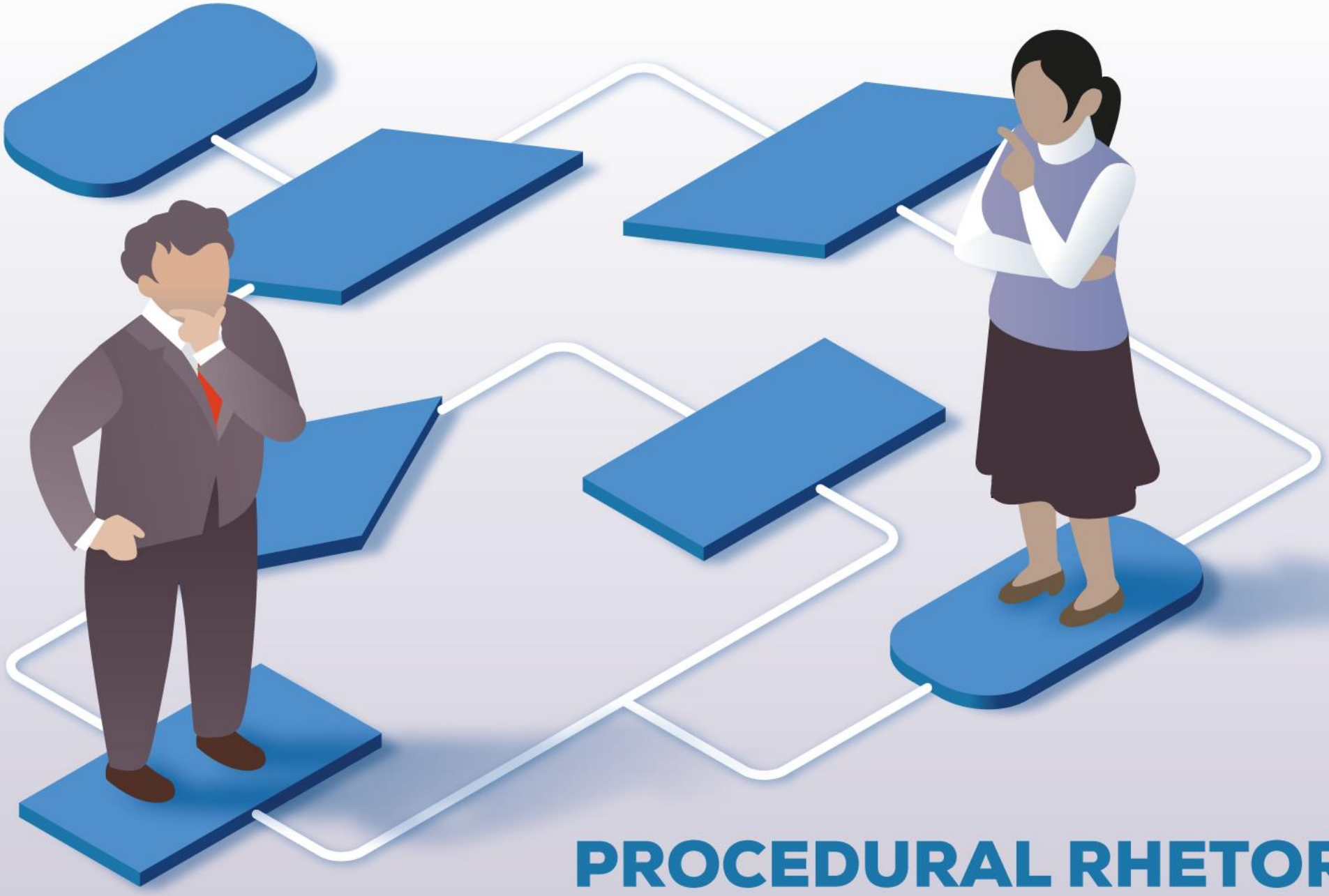
Social-ecological system framework: initial changes and continuing challenges

Michael D. McGinnis[1] *and Elinor Ostrom*[1]

ABSTRACT. The social-ecological system (SES) framework investigate
disciplinary backgrounds working on different resource sectors in disparat
domains to share a common vocabulary for the construction and testing
influences on processes and outcomes are especially critical in specific empi
to this framework and discuss a few remaining ambiguities in its formulati
list of relevant attributes of governance systems and discuss other ways to
natural resource settings. The SES framework will continue to change as n
purpose of this article is to delineate the version that served as the basis for t
in other contributions to this special issue.

Key Words: *frameworks; governance; institutional analysis; social-ecological*





PROCEDURAL RHETORIC

ENERGY TRANSITION GAME

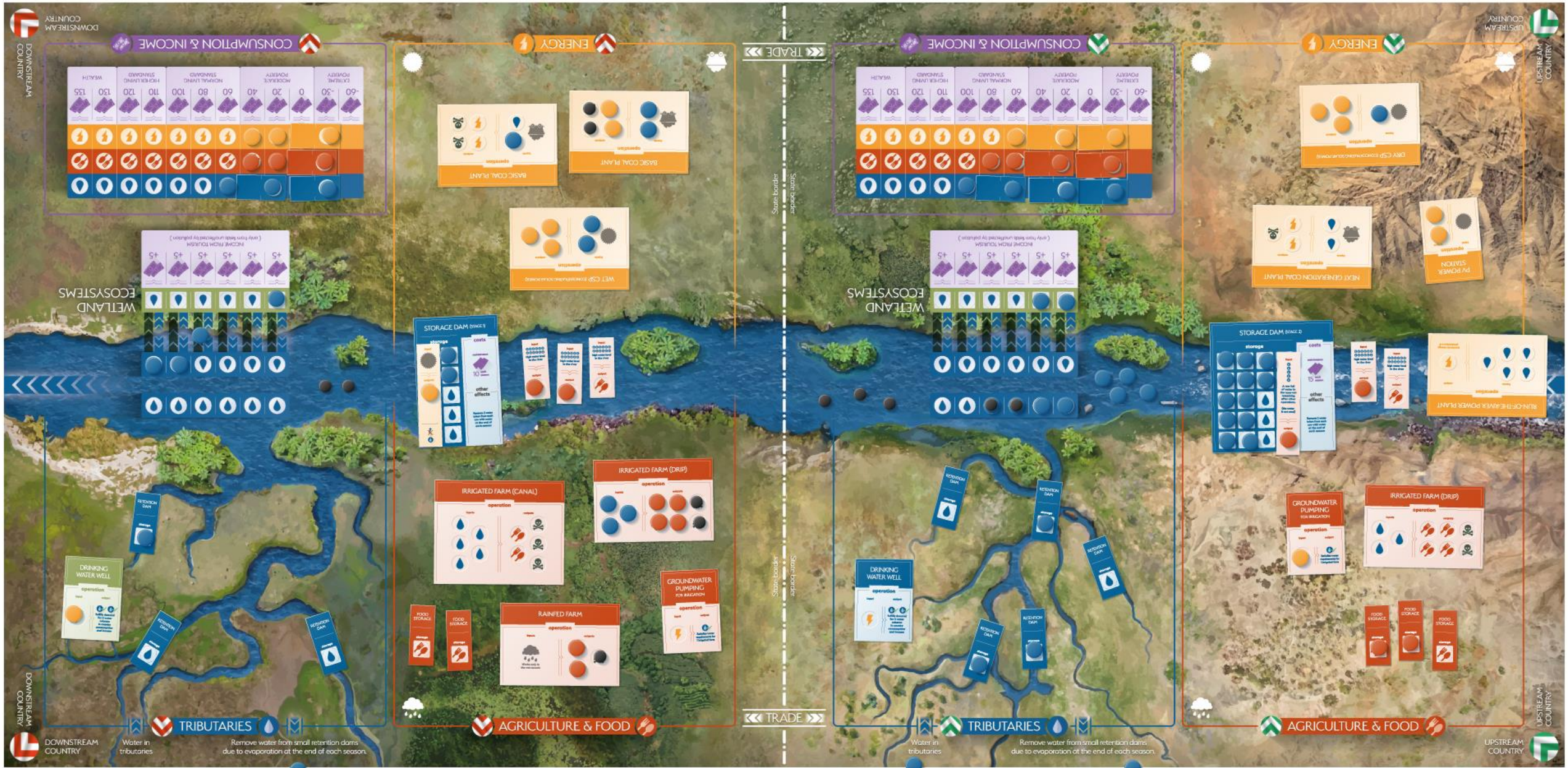
SHAPE THE FUTURE OF THE ENERGY SECTOR!

TRAILER:

https://www.youtube.com/watch?v=-p3p9VBQ0K0&t=1s&ab_channel=CentreforSystemsSolutions

NEXUS GAME

Exploring synergies and trade-offs between policies affecting water, energy, and land.


DOWNSTREAM COUNTRY
CONSUMPTION & INCOME
ENERGY
TRADE
State border
WETLAND ECOSYSTEMS
STORAGE DAM (STAGE 1)
BASIC COAL PLANT
WET CSP
IRRIGATED FARM (CANAL)
IRRIGATED FARM (DRIP)
RAINFED FARM
GROUNDWATER PUMPING
FOOD STORAGE
RETENTION DAM
DRINKING WATER WELL
TRIBUTARIES
AGRICULTURE & FOOD
Water in tributaries
Remove water from small retention dams due to evaporation at the end of each season.
UPSTREAM COUNTRY
DRY CSP
PV POWER STATION
NEXT GENERATION COAL PLANT
RUN-OF-THE-RIVER POWER PLANT
STORAGE DAM (STAGE 2)


MINISTRY OF FOOD & AGRICULTURE
UPSTREAM COUNTRY
ROLES
DECISIONS
0
20
40
60
80
100
110
120
MODERATE POVERTY
NORMAL LIVING STANDARD
HIGHER LIVING STANDARD
CONSUMPTION & INCOME
SOCIAL AND ECONOMIC RULES
WETLAND ECOSYSTEMS
ENVIRONMENT

TRAILER:

https://www.youtube.com/watch?v=X53vOkzcV_k&ab_channel=CentreforSystemsSolutions

Global Environmental Change 66 (2021) 102204

Contents lists available at ScienceDirect

Global Environmental Change

journal homepage: www.elsevier.com/locate/gloenvcha

Simulation games as a catalyst for social learning: The case of the water-food-energy nexus game

Junko Mochizuki [a,*], Piotr Magnuszewski [a,b], Michal Pajak [b], Karolina Krolikowska [b,c], Lukasz Jarzabek [b], Michalina Kulakowska [b]

[a] International Institute for Applied Systems Analysis (IIASA), Schlossplatz 1, A-2361 Laxenburg, Austria
[b] Centre for Systems Solutions (CRS), Stefana Jaracza 80b/10, 50-305 Wrocław, Poland
[c] Faculty of Finance and Accounting, WSB University in Wroclaw, Wroclaw 53-609, Poland

ARTICLE INFO

Keywords:
Role-playing simulation (RPS)
Social learning
Procedural rhetoric
Water–energy–food nexus
Nexus game

ABSTRACT

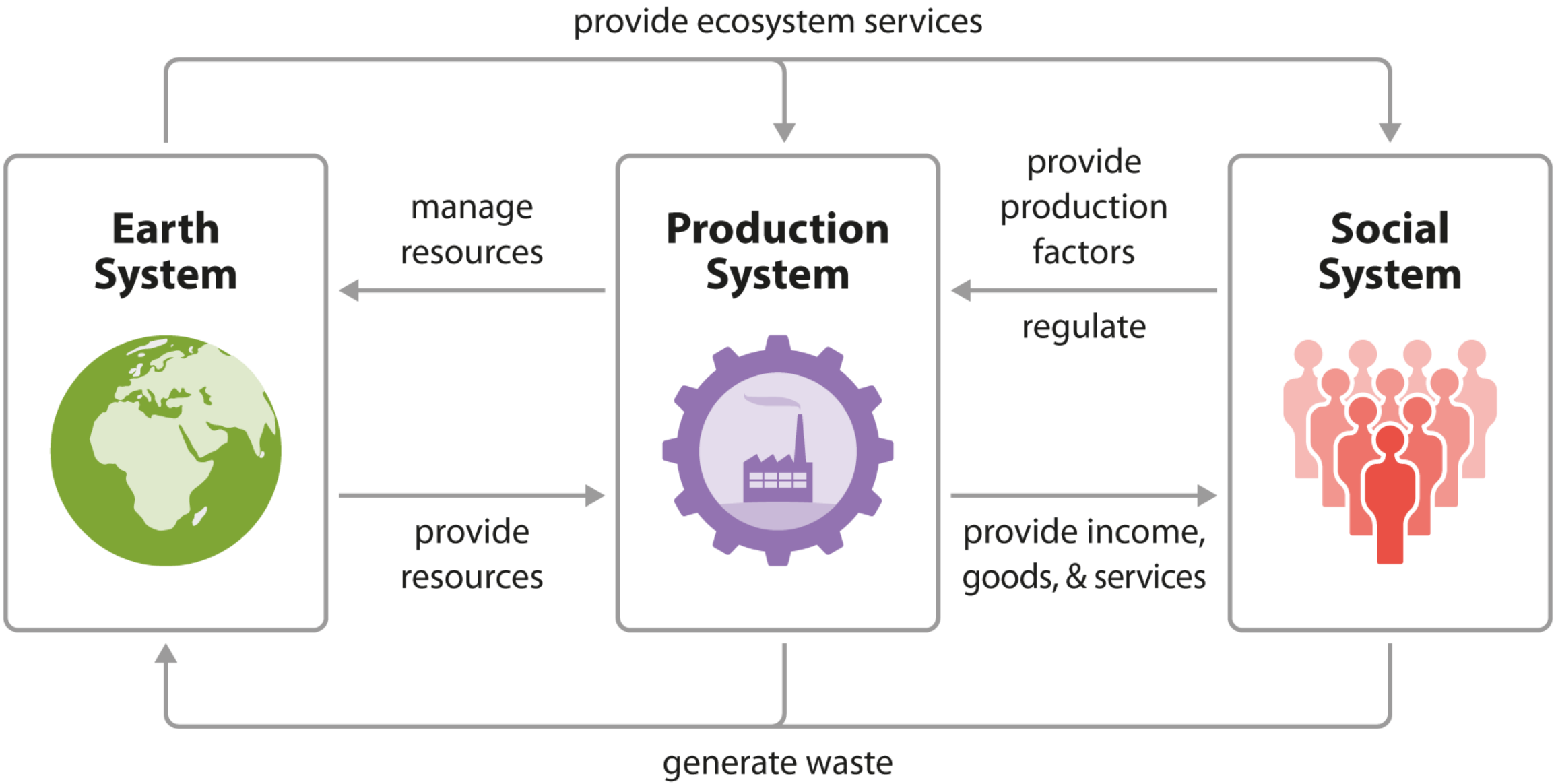
Role-playing simulations have gained in popularity in recent years as a novel method of engaging researchers and stakeholders in a variety of social and environmental issues. While academic interest has grown on this topic, knowledge remains sparse on the underlying theories that may guide the design of such games. Thsi article introduces a new game design framework - Com-pleC-Sus (Com-plex-ity-Col-lab-o-ra-tion-Sus-tain-abil-ity) - built on the concepts of social learning and procedural rhetoric. We describe and discuss the conceptual basis for our framework, giving a detailed account of its application through the recently developed the Water–Food–Energy Nexus Game (Nexus Game) as an example. We illustrate the process involved in designing the Nexus Game through initial scoping, prototyping, and design decisions, and how game structure and debriefing have been crafted to foster social learning focused on the understanding of the underlying social-ecological system as well as fostering collaboration between stakeholders. We also provide the analysis of qualitative data collected during recent gaming sessions across three continents to evaluate the Nexus Game's potential learning effects.

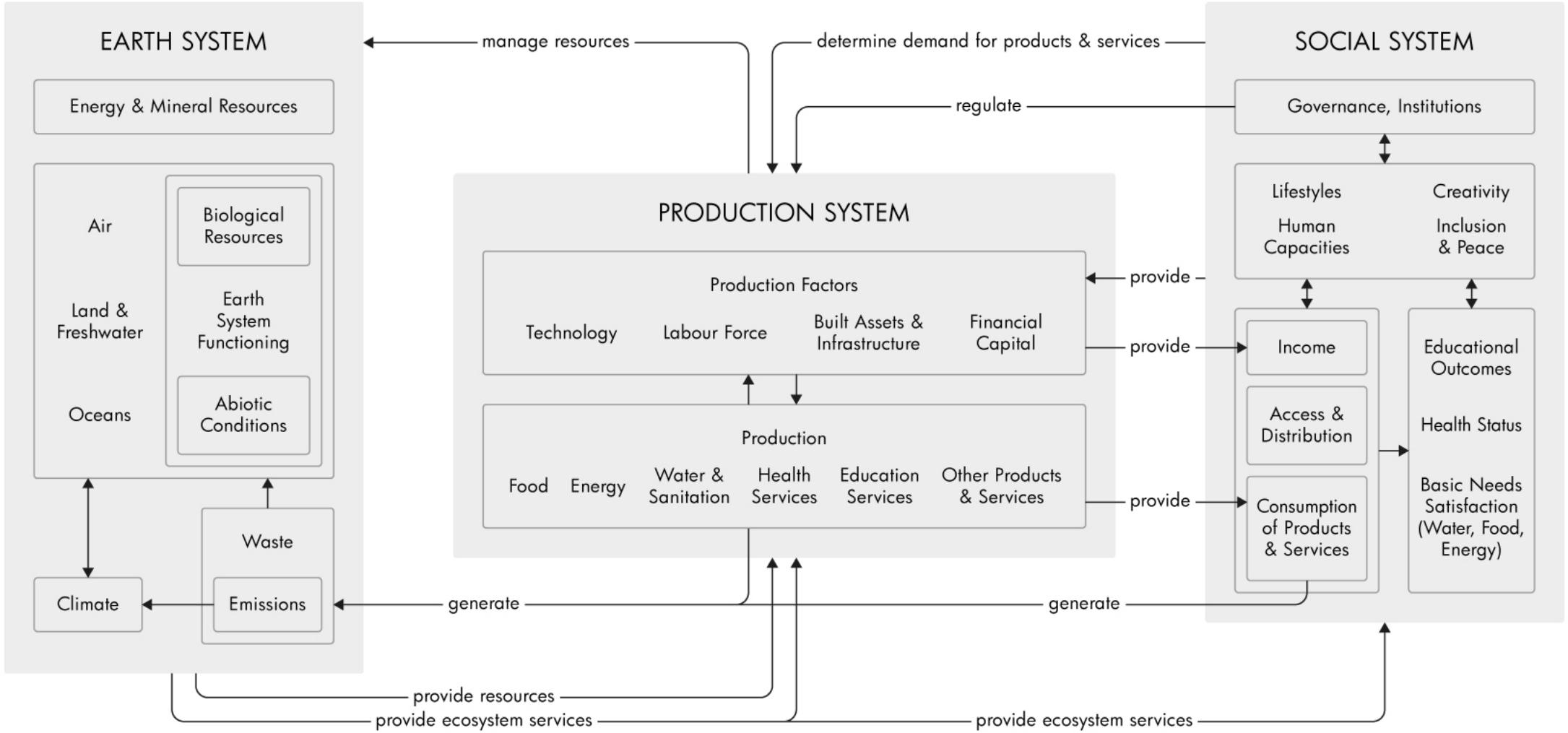
Centre for Systems Solutions

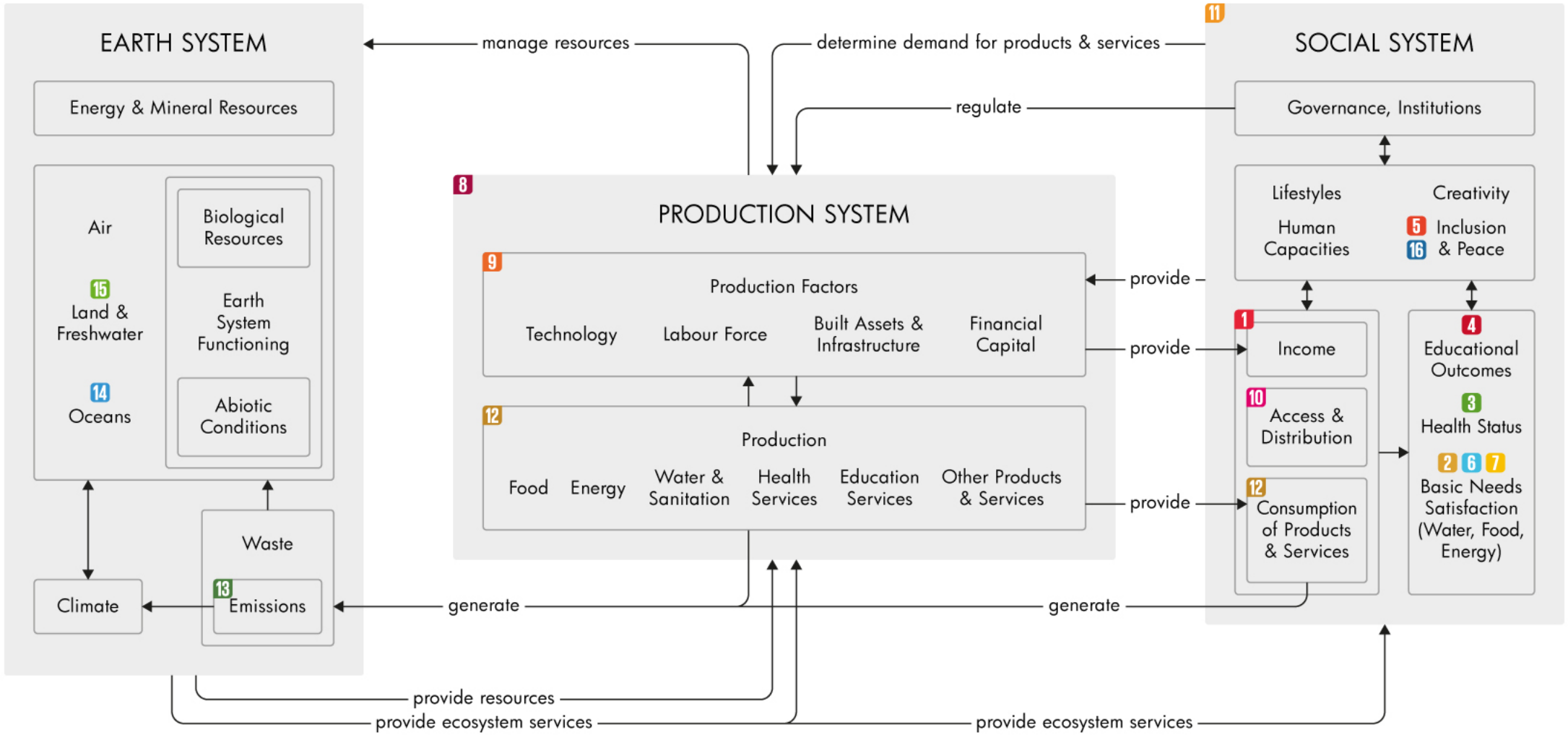
International Institute for Applied Systems Analysis

THE WORLD'S FUTURE

A SUSTAINABLE DEVELOPMENT GOALS GAME


provide ecosystem services
Earth System
manage resources
provide resources
Production System
provide production factors
regulate
provide income, goods, & services
Social System
generate waste


EARTH SYSTEM
Energy & Mineral Resources
Air
Land & Freshwater
Oceans
Biological Resources
Earth System Functioning
Abiotic Conditions
Waste
Climate
Emissions
manage resources
determine demand for products & services
regulate
PRODUCTION SYSTEM
Production Factors
Technology
Labour Force
Built Assets & Infrastructure
Financial Capital
Production
Food
Energy
Water & Sanitation
Health Services
Education Services
Other Products & Services
provide
provide
provide
SOCIAL SYSTEM
Governance, Institutions
Lifestyles
Creativity
Human Capacities
Inclusion & Peace
Income
Access & Distribution
Consumption of Products & Services
Educational Outcomes
Health Status
Basic Needs Satisfaction (Water, Food, Energy)
generate
generate
provide resources
provide ecosystem services
provide ecosystem services



1 NO POVERTY
2 ZERO HUNGER
3 GOOD HEALTH AND WELL-BEING
4 QUALITY EDUCATION
5 GENDER EQUALITY
6 CLEAN WATER AND SANITATION
7 AFFORDABLE AND CLEAN ENERGY
8 DECENT WORK AND ECONOMIC GROWTH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE
10 REDUCED INEQUALITIES
11 SUSTAINABLE CITIES AND COMMUNITIES
12 RESPONSIBLE CONSUMPTION AND PRODUCTION
13 CLIMATE ACTION
14 LIFE BELOW WATER
15 LIFE ON LAND
16 PEACE, JUSTICE AND STRONG INSTITUTIONS


SUSTAINABLE
DEVELOPMENT
GOALS
LAND USE CHANGE
MINISTRY OF WATER
& ENVIRONMENT


SUSTAINABLE
LAURENTIA

TRAILER:

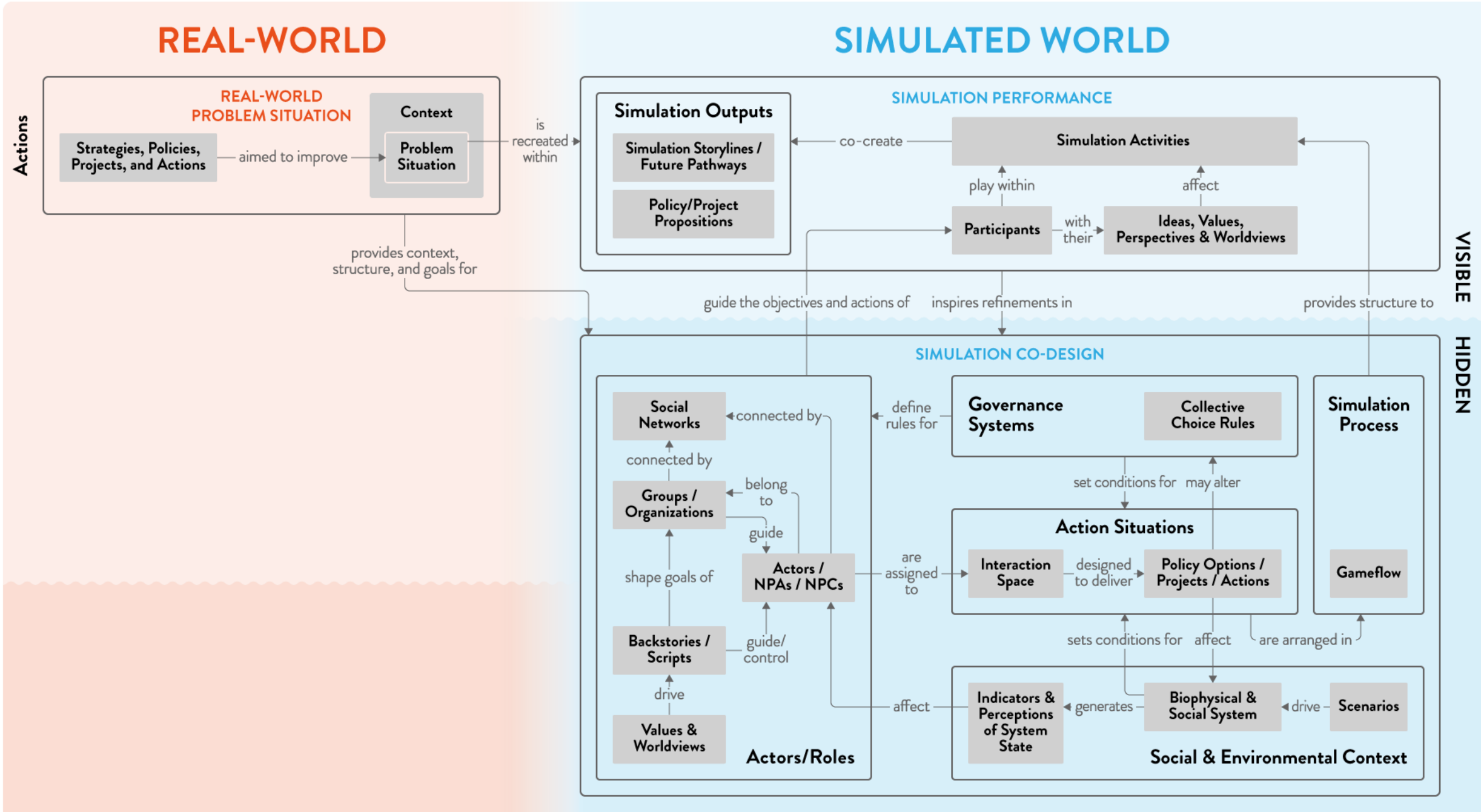
https://www.youtube.com/watch?v=5uLUPsx34Nk&ab_channel=CentreforSystemsSolutions

3. SIMULATION PERFORMANCE

Let’s Play


3. SIMULATION PERFORMANCE
GAMEFLOW
1→2→3→4
PATHWAYS
BREAKING NEWS
19-01
SOCIAL MEDIA
BACK-STORY
CRISIS
BACK-STORIES
§
DECISIONS

SOCIAL SIMULATION DESIGN AND APPLICATION FRAMEWORK



Application of the Policy Simulation

INDUS RIVER BASIN

CURRENT SITUATION

pathways to resilient futures

deep climate crisis

SCENARIOS

cascading climate impacts

cascading climate impacts

STAKEHOLDER VISIONS

provide input for

provide feedback and revisions suggestions

provide feedback and corrections

RESEARCH MODELS & ANALYSIS

POLICY RECOMMENDATIONS


GLACIERS

nature sustainability

ARTICLES

https://doi.org/10.1038/s41893-020-00654-7

Check for updates

Transboundary cooperation a potential route to sustainable development in the Indus basin

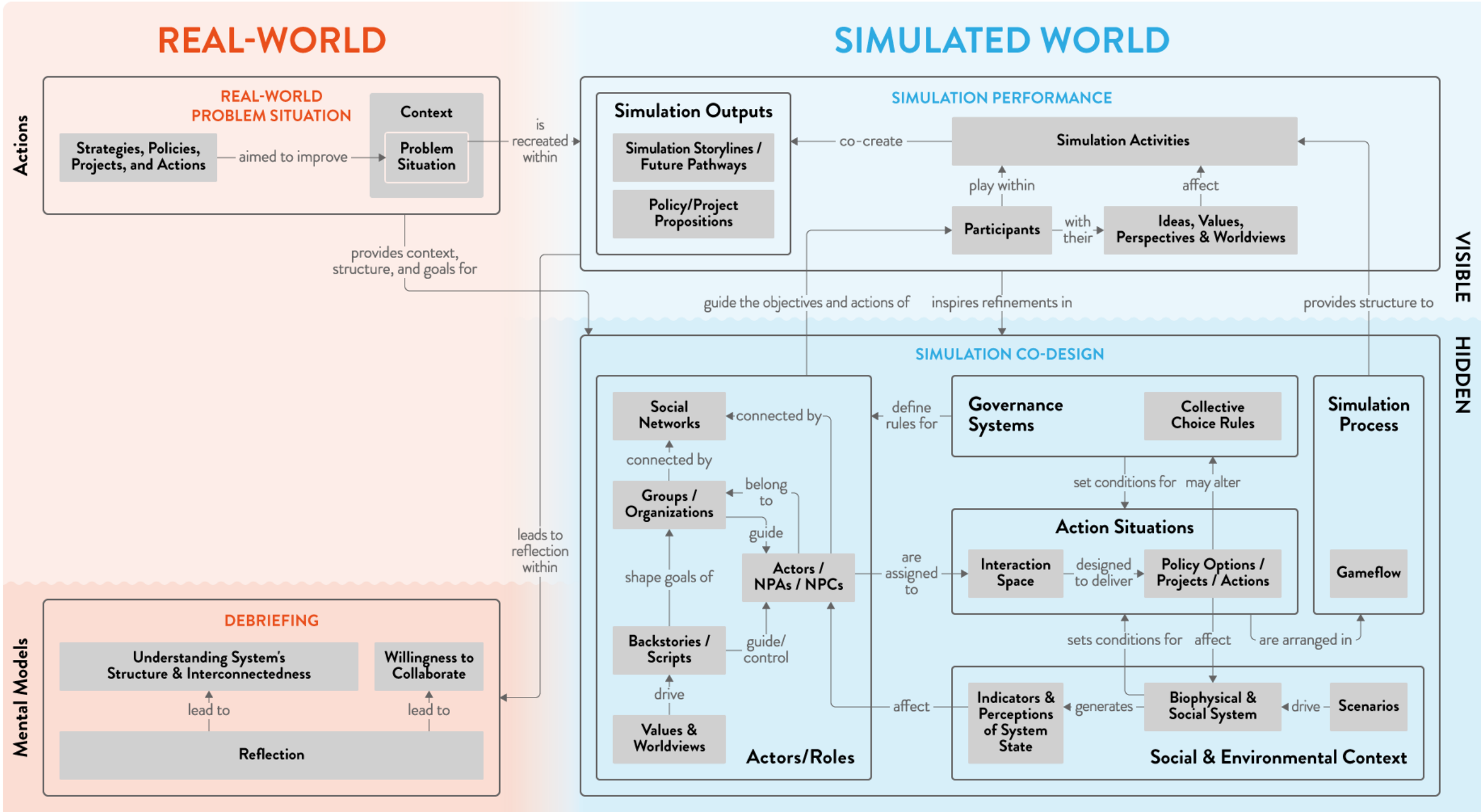
Adriano Vinca[1,2] ✉, Simon Parkinson[1,2], Keywan Riahi[1,2,3], Edward Byers[1], Afreen Siddiqi[4,5], Abubakr Muhammad[6], Ansir Ilyas[6], Nithiyanandam Yogeswaran[7], Barbara Willaarts[1], Piotr Magnuszewski[1], Muhammad Awais[1,2], Andrew Rowe[2] and Ned Djilali[2,8]

With a rapidly growing population of 250 million, the Indus river basin in South Asia is one of the most intensively cultivated regions on Earth, highly water stressed and lacking energy security. Yet, most studies advising sustainable development policy have lacked multi-sectoral and cross-country perspectives. Here we show how the countries in the Indus basin could lower costs for development and reduce soil pollution and water stress by cooperating on water resources and electricity and food production. According to this analysis, Indus basin countries need to increase investments to US$10 billion per yr to mitigate water scarcity issues and ensure improved access to resources by 2050. These costs could shrink to US$2 billion per yr, with economic gains for all, if countries pursued more collaborative policies. Downstream regions would benefit most, with reduced food and energy costs and improved water access, while upstream regions would benefit from new energy investments. Using integrated water–energy–land analysis, this study quantifies the potential benefits of novel avenues to sustainable development arising from greater international cooperation.

4. DEBRIEFING


4. DEBRIEFING
BREAKING NEWS
SOCIAL MEDIA
LIVE
19:01

SOCIAL SIMULATION DESIGN AND APPLICATION FRAMEWORK




"I was surprised by how **engaging** the Nexus Game was!
Serious games are a valuable tool to get people
to see something from **different perspective**
and to play different roles to **see the larger picture**
and **experiment** in a **risk-free environment**.
"Such exercises can build **trust** and **understanding**."

WHAT PARTICIPANTS SAY

"The game translates a lot of knowledge and, in this particular case, threats into quite lively experiences. These last much longer in the minds of the players than the same information in the form of books."

"It really helps to better understand the complexity of the 'real world', why changes are so slow, why solutions are not put into place, why international cooperation is so complicated."

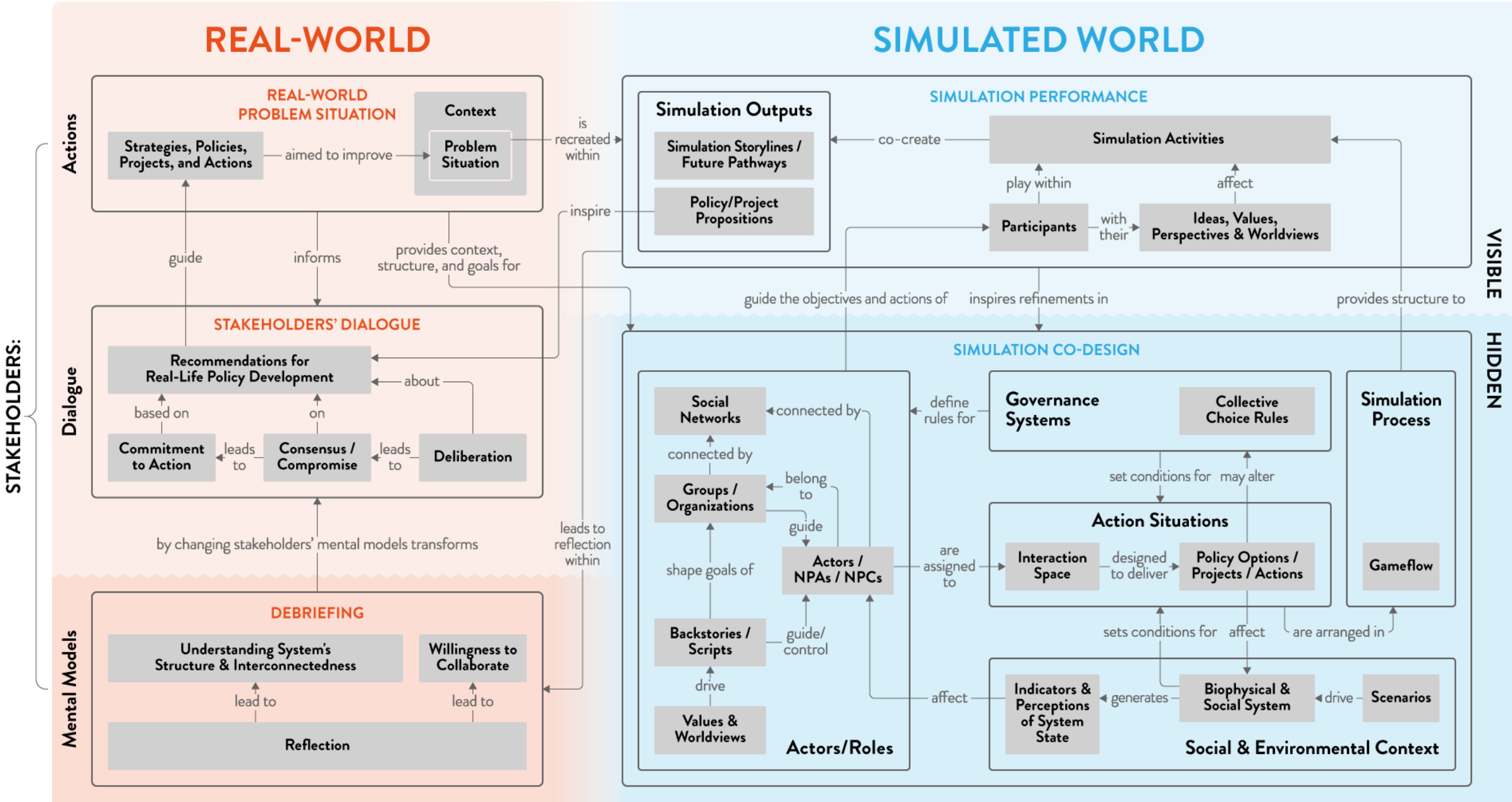
"You get personally involved and, by this, a better understanding of processes and how complexity and uncertainty may influence decisions."

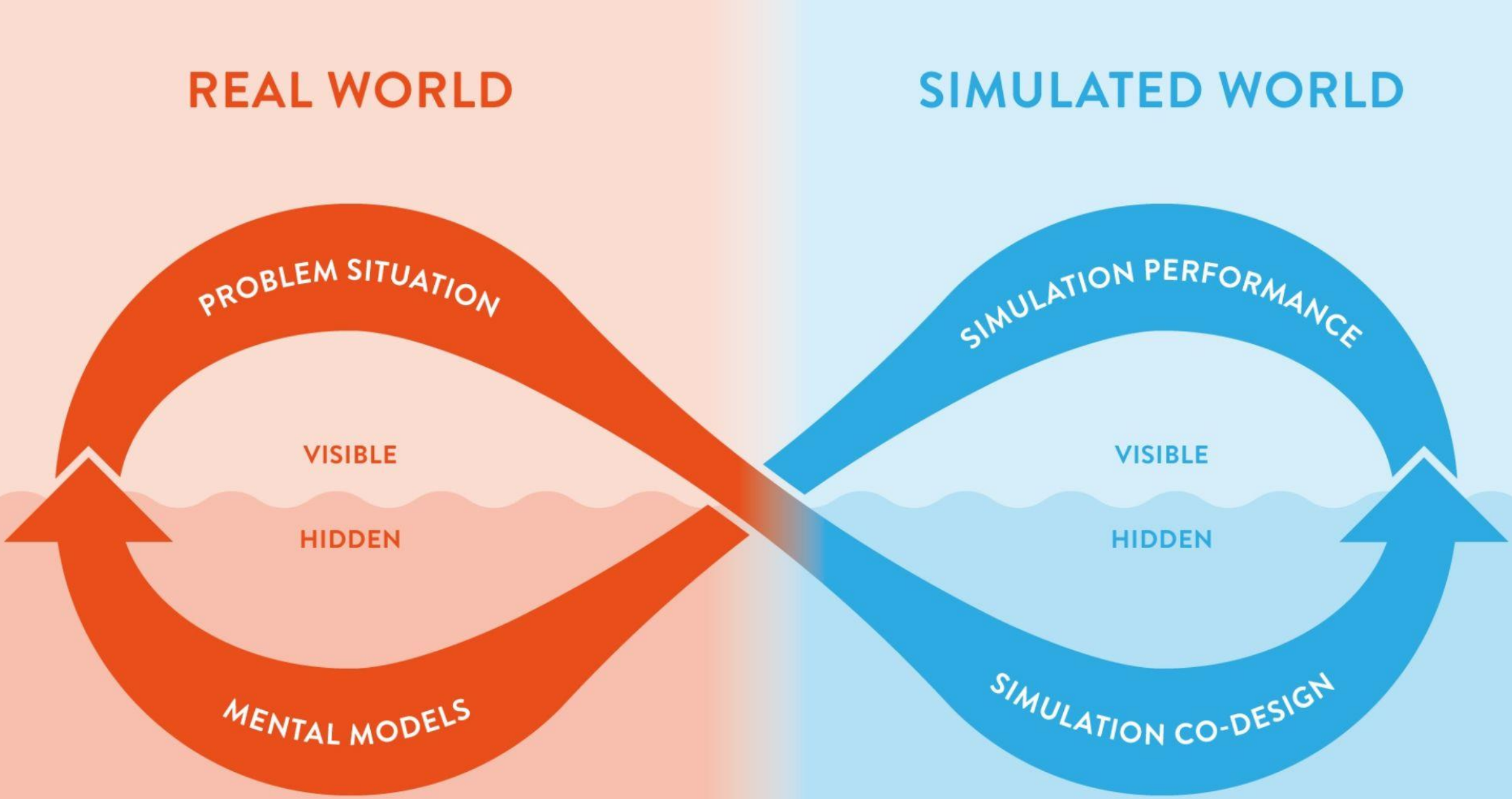
5. STAKEHOLDERS DIALOGUE

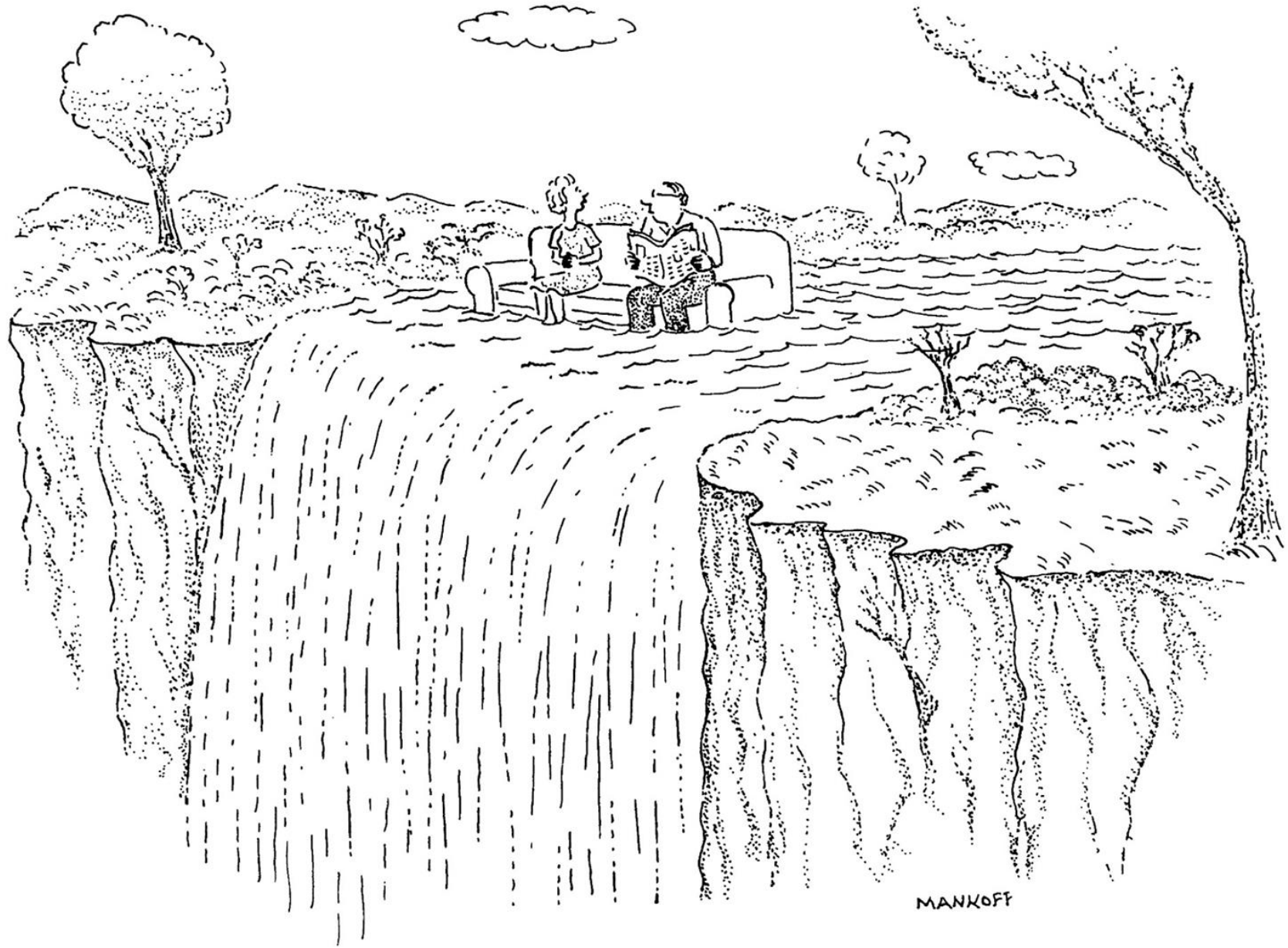
5. STAKEHOLDERS' DIALOGUE


5. STAKEHOLDERS' DIALOGUE
1. REAL-WORLD PROBLEM SITUATION
2. SIMULATION CO-DESIGN
CRISIS
ACTIONS
OUTCOMES
TIMELINE
ROLES & BACKSTORIES
4. DEBRIEFING
3. SIMULATION PERFORMANCE
BREAKING NEWS
SOCIAL MEDIA
BACK-STORY
BACK-STORIES
GAMEFLOW 1→2→3→4
PATHWAYS
CRISIS
DECISIONS

SOCIAL SIMULATION DESIGN AND APPLICATION FRAMEWORK




REAL WORLD
SIMULATED WORLD
PROBLEM SITUATION
VISIBLE
HIDDEN
MENTAL MODELS
SIMULATION PERFORMANCE
VISIBLE
HIDDEN
SIMULATION CO-DESIGN



"Brad, we've got to talk."

Tragedy of the Commons

Tragedy of the Commons

Garret Hardin 1969

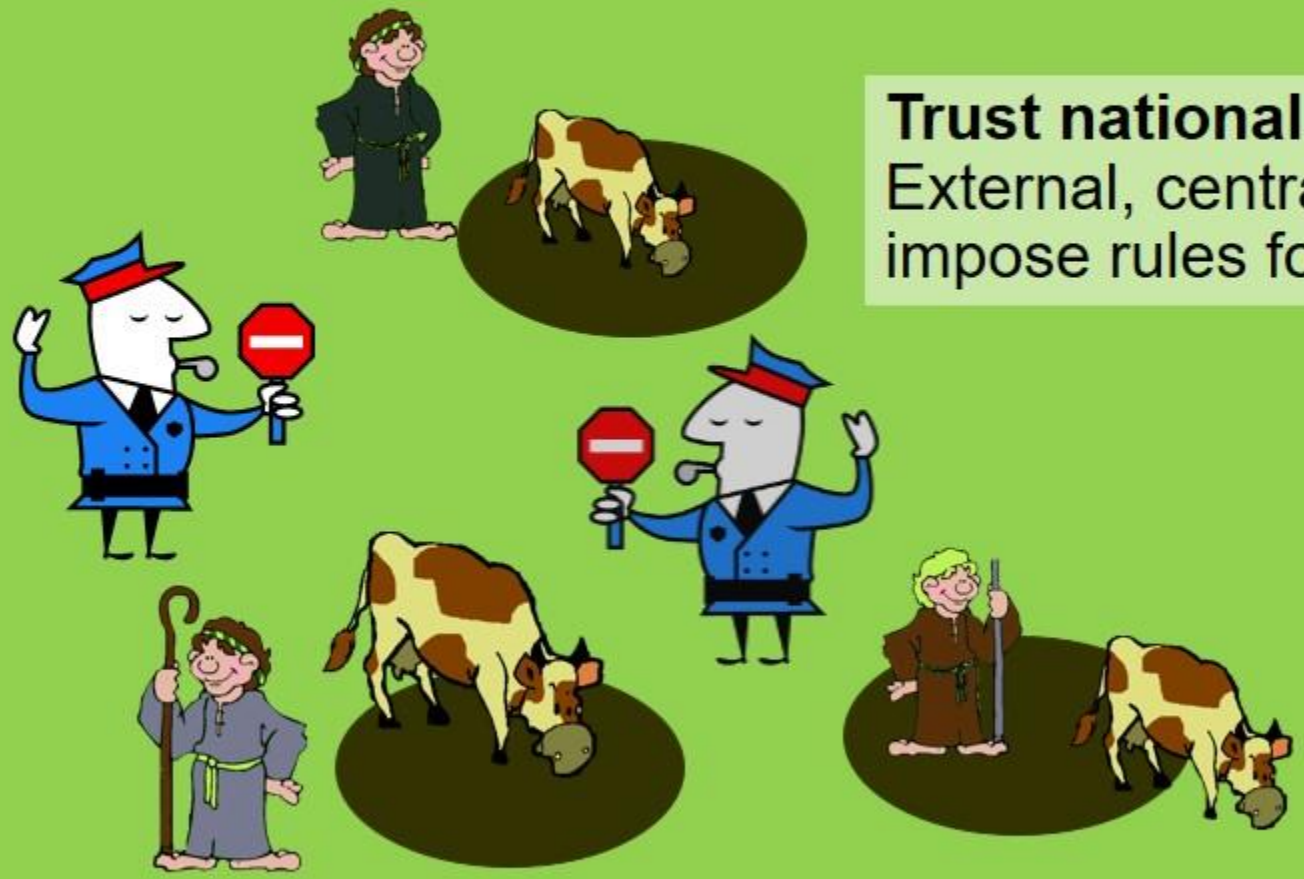
Assumptions:

individual self-interest
"rational" economic behavior

Conclusions:

Common Pool Resources (fish, trees, soil, wildlife)
will inevitably be exhausted by actions of
independent, selfish actors who invariably ignore
the common good in favor of short-term, personal gain.

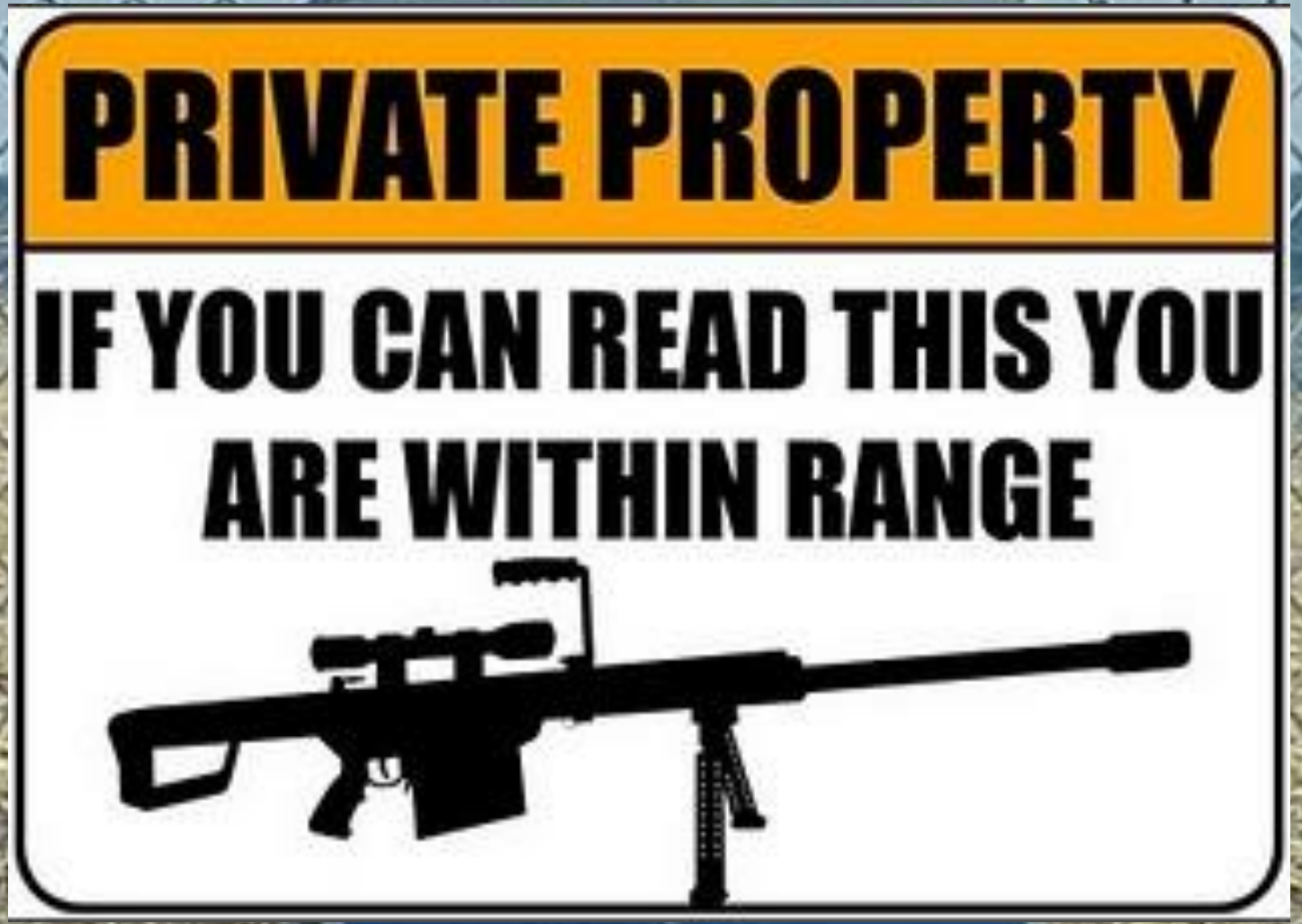
How to avoid tragedy of the commmons?



Trust national actors not locals
External, central authorities must impose rules for regional control.

Answer no 1: State Control

How to avoid tragedy of the commmons?



Answer no 2: Privatization

Tragedy can be avoided!

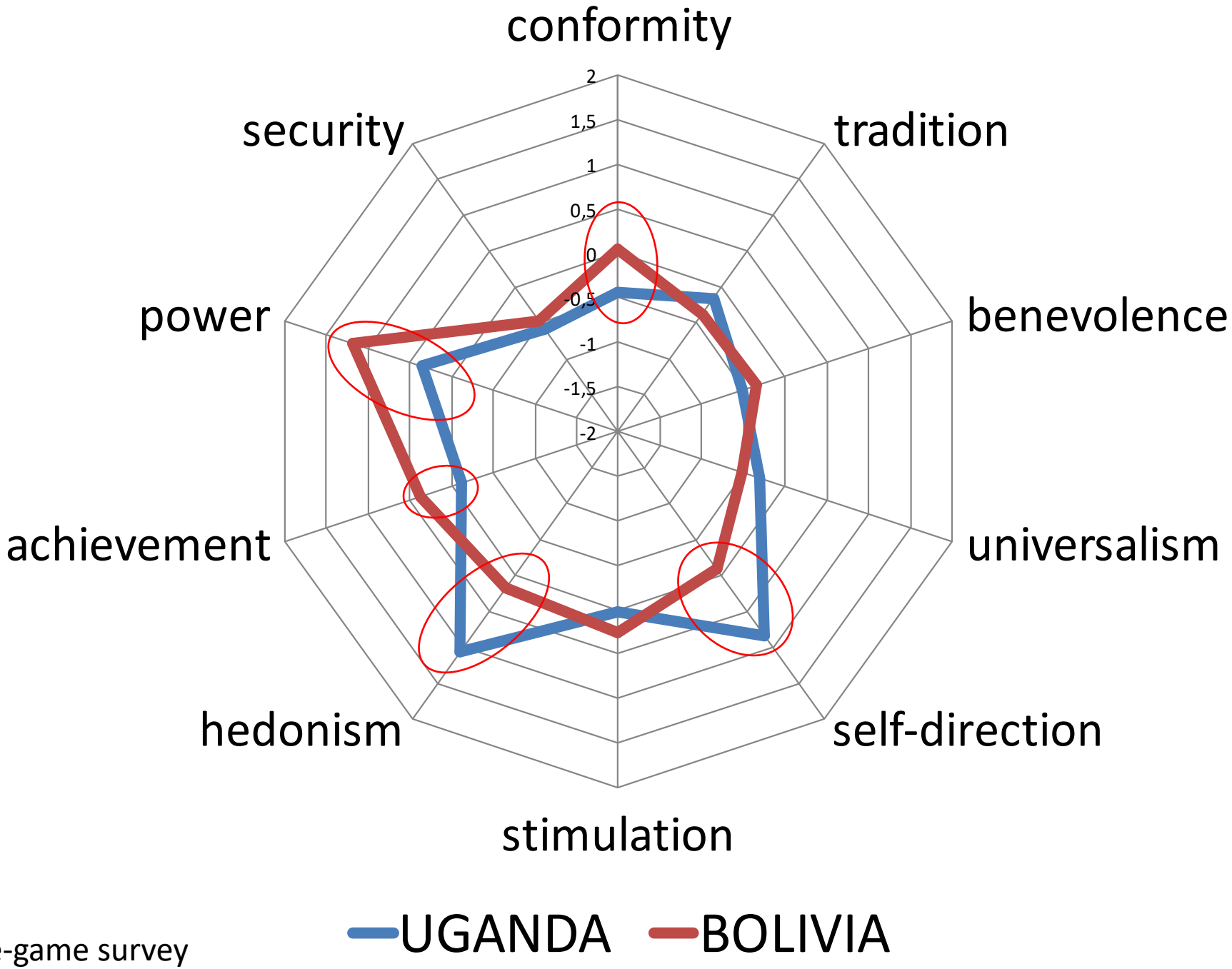
Empirical research:

Local resource users can self-organize to cooperatively develop their own institutional regulations to manage common pool resources in sustainable ways.

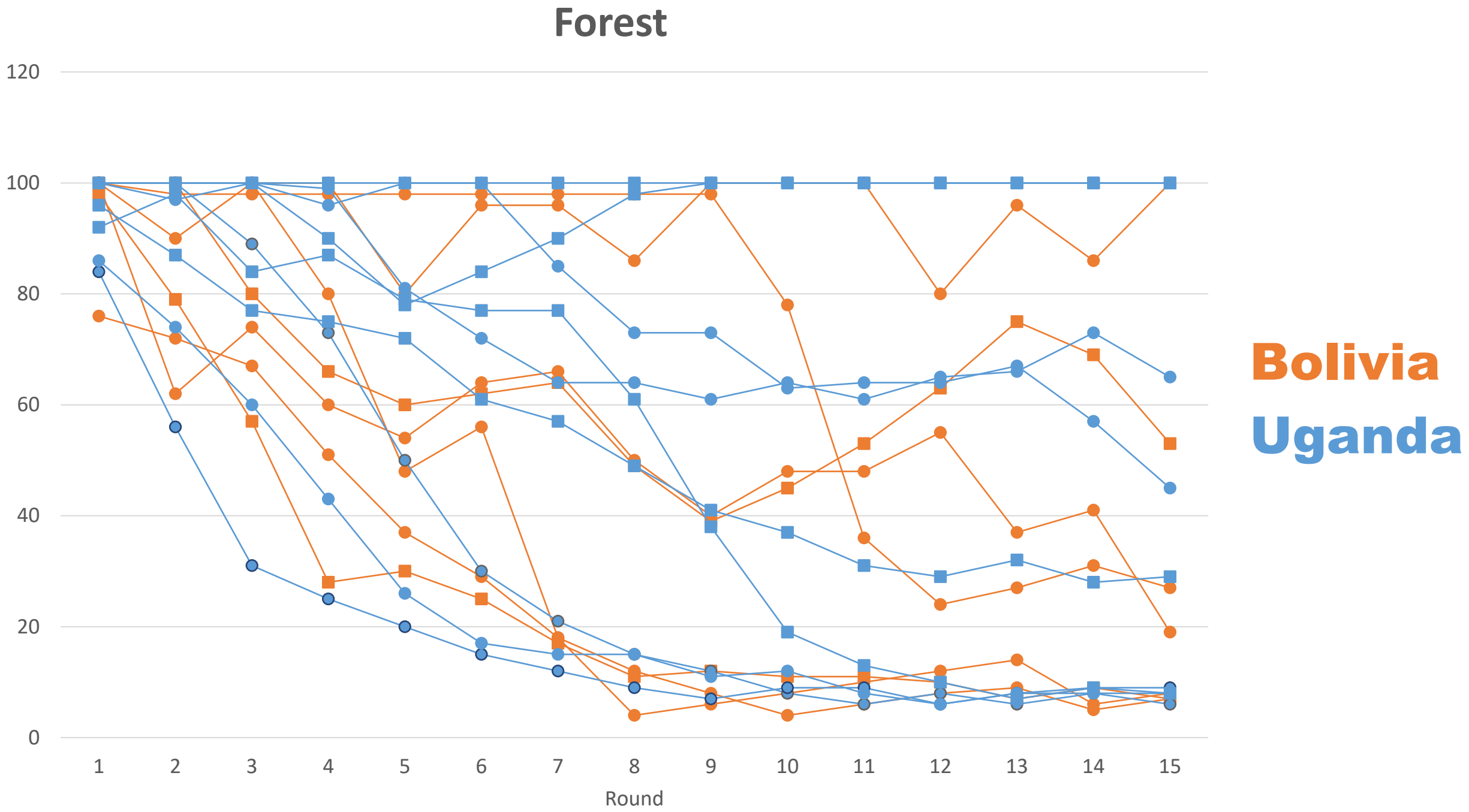
Demonstrated in more than 500 case studies around the world!

Elinor Ostrom


Forest
Game



Data from the pre-game survey


Forest
120
100
80
60
40
20
0
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
Round
Bolivia
Uganda

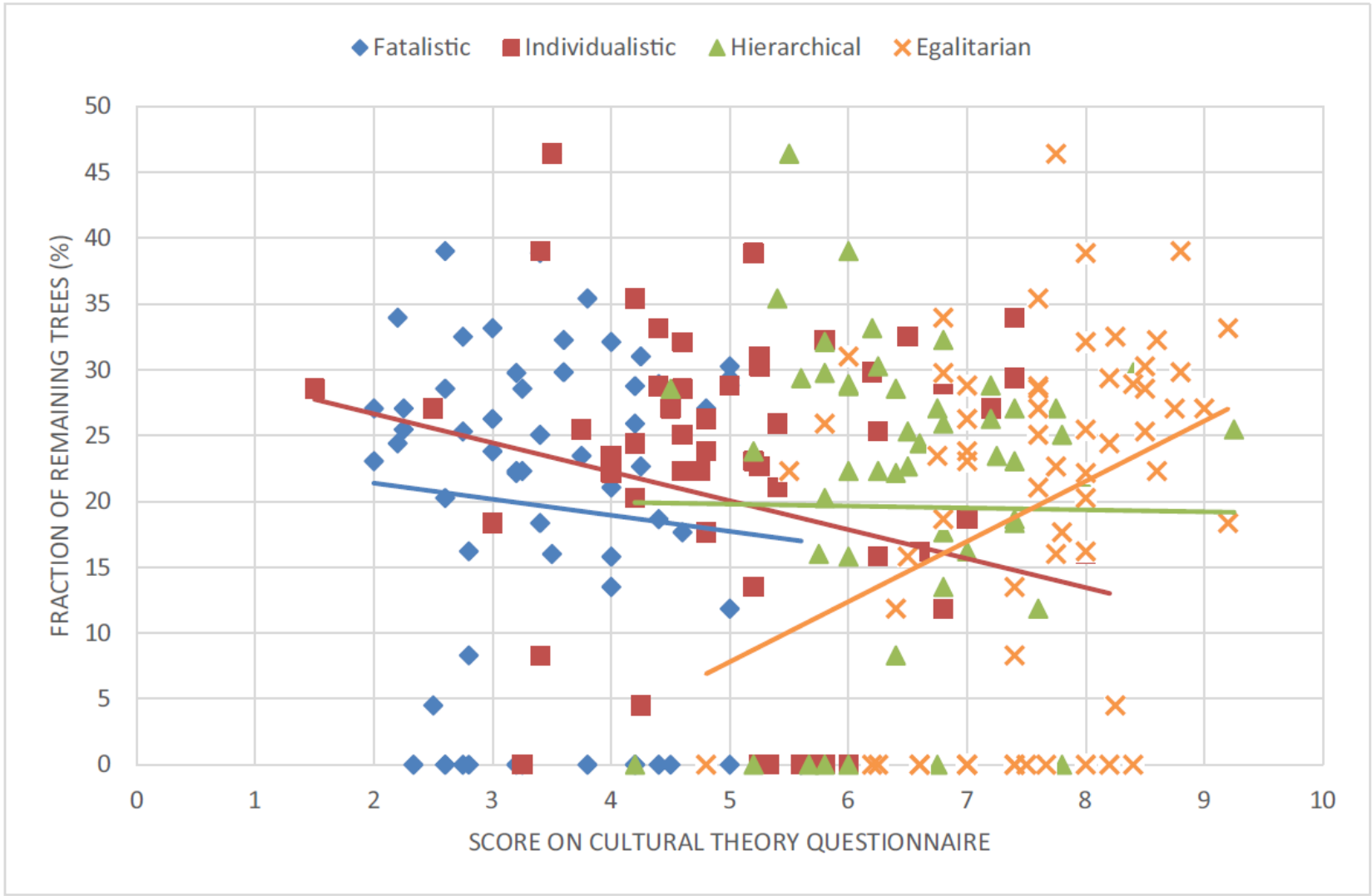


Fig. 3. Group averages of worldview scores plotted against group averages of remaining trees. Each circle represents a group's average score on one of the four worldviews plotted against the same group's average number of remaining trees. Trendlines are calculated with the least squares regression.

Ecological Economics 156 (2019) 287–292

Contents lists available at ScienceDirect

Ecological Economics

journal homepage: www.elsevier.com/locate/ecolecon

Analysis

A Game of Common-pool Resource Management: Effects of Communication, Risky Environment and Worldviews

Peter Bednarik[a,b,*], Joanne Linnerooth-Bayer[a], Piotr Magnuszewski[a,c], Ulf Dieckmann[a]

[a] International Institute of Applied Systems Analysis (IIASA), Schlossplatz 1, A-2361 Laxenburg, Austria
[b] Vienna University of Economics and Business, Welthandelsplatz 1, A-1020 Vienna, Austria
[c] Centre for Systems Solutions, Jaracza 80b/10, 50-305 Wrocław, Poland

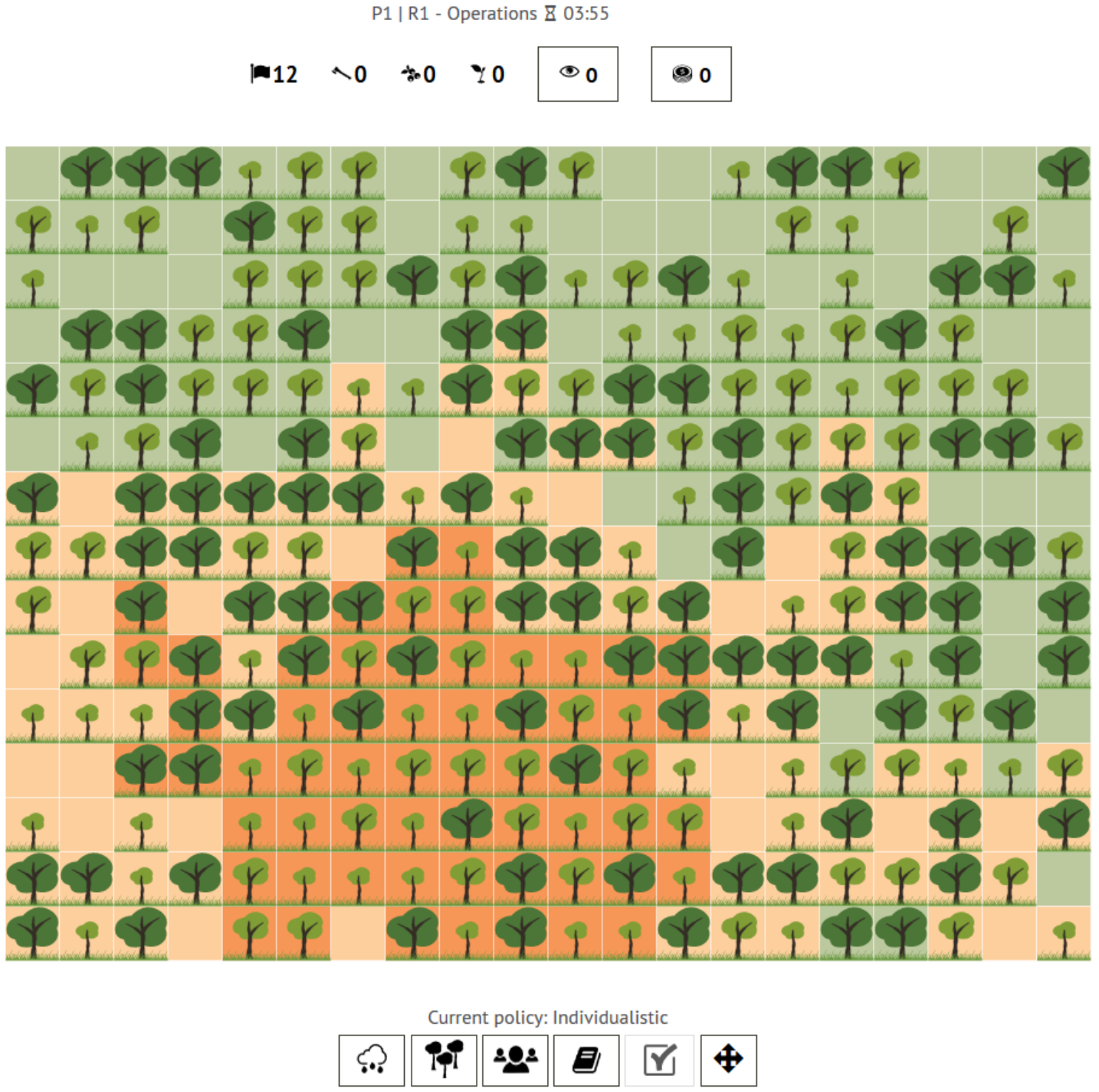
ARTICLE INFO

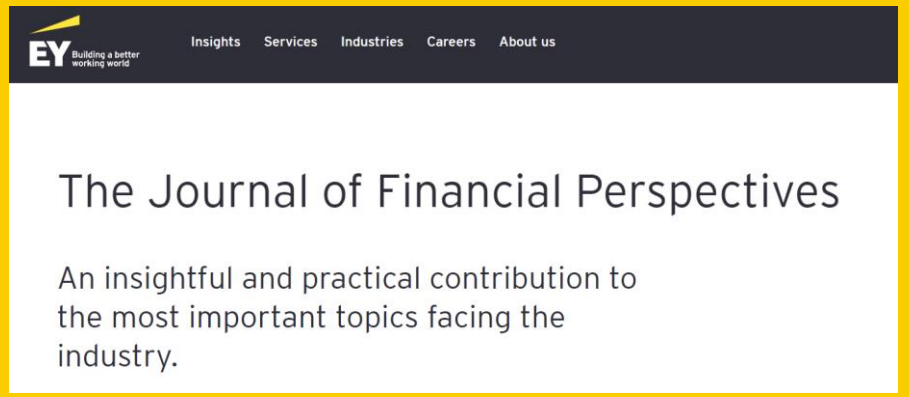
Keywords:
Tragedy of the commons
Social dilemma
Cooperation
Behavioural experiment
Cultural theory

ABSTRACT

The 'tragedy of the commons' has been investigated for several decades. At its centre is the question whether a common resource will collapse under over-exploitation. The isolated analysis of one resource has many conceptual benefits, yet in reality resources and welfare are intertwined. In this paper, we investigate a situation where a resource which is exploited for profit has the additional feature of protecting against risk. Our main question is whether participants in an experimental game will prioritize such additional feature over maximizing profit and, if so, to what extent. Therefore, we designed a forest-harvesting game: Participants can harvest trees to generate income, and at the same time the forest serves as a protection against floods. Communication has been shown to play a vital role in managing commons. Our second aim is to test the importance of communication when the resource functions as a device of protecting against external risk. Lastly, we introduce a new perspective to the tragedy of the commons literature. Specifically, we investigate how the anthropologically motivated theory of risk perception (often called Cultural Theory) correlates with behaviour in our economic game. We believe that there is much potential in combining insights from these separate disciplines.

Would you cut more trees if you get a bonus?





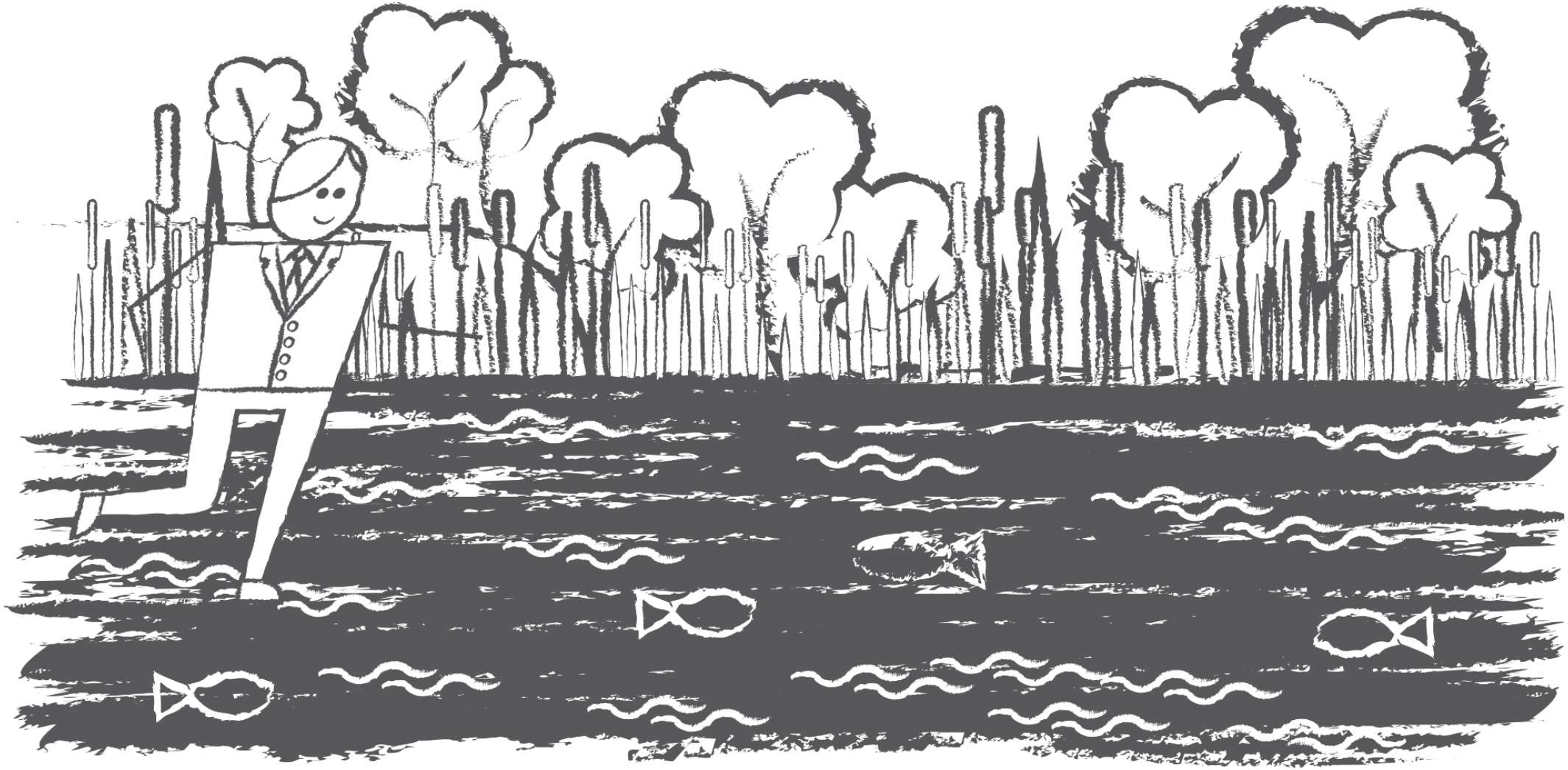
Ostrom game theory applied to financial services bonuses and policy improvements



Aidan Walsh
EY Tax Partner, EMEIA Financial Services, Ireland; member of the Irish Prime Minister's Banking and Treasury Group

Malcolm Brady
Dublin City University

Piotr Magnuszewski
Centre for Systems Solutions, Wroclaw
International Institute for Applied Systems Analysis, Laxenburg



Lords of the Valley

SIMULATION

Centre
for Systems
Solutions


Sustainability Transition
at the
Tisza River

Hungarian Tisza River Floodplain

Pre- and Post- Engineering under the original Vasarhelyi Plan (1870)

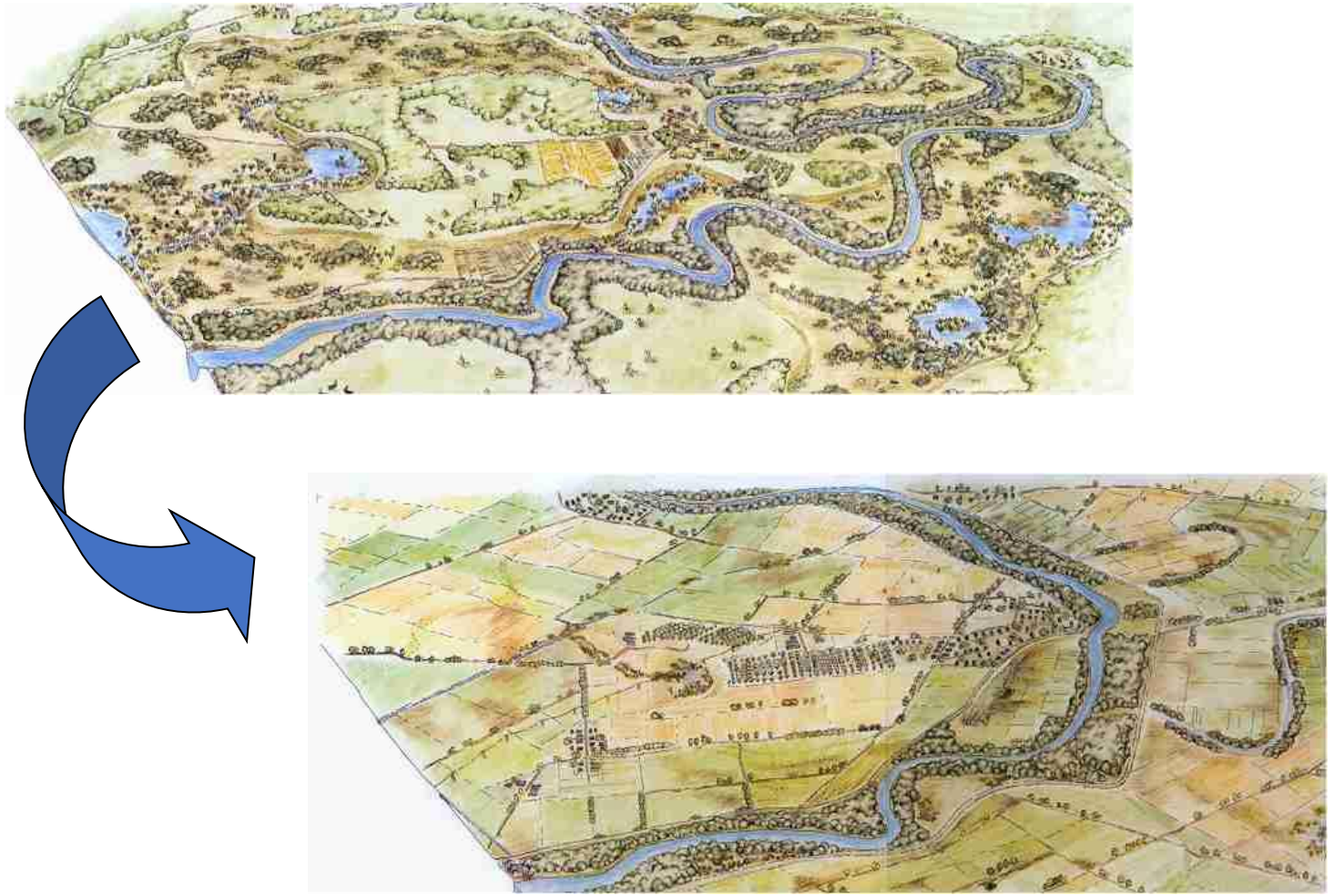
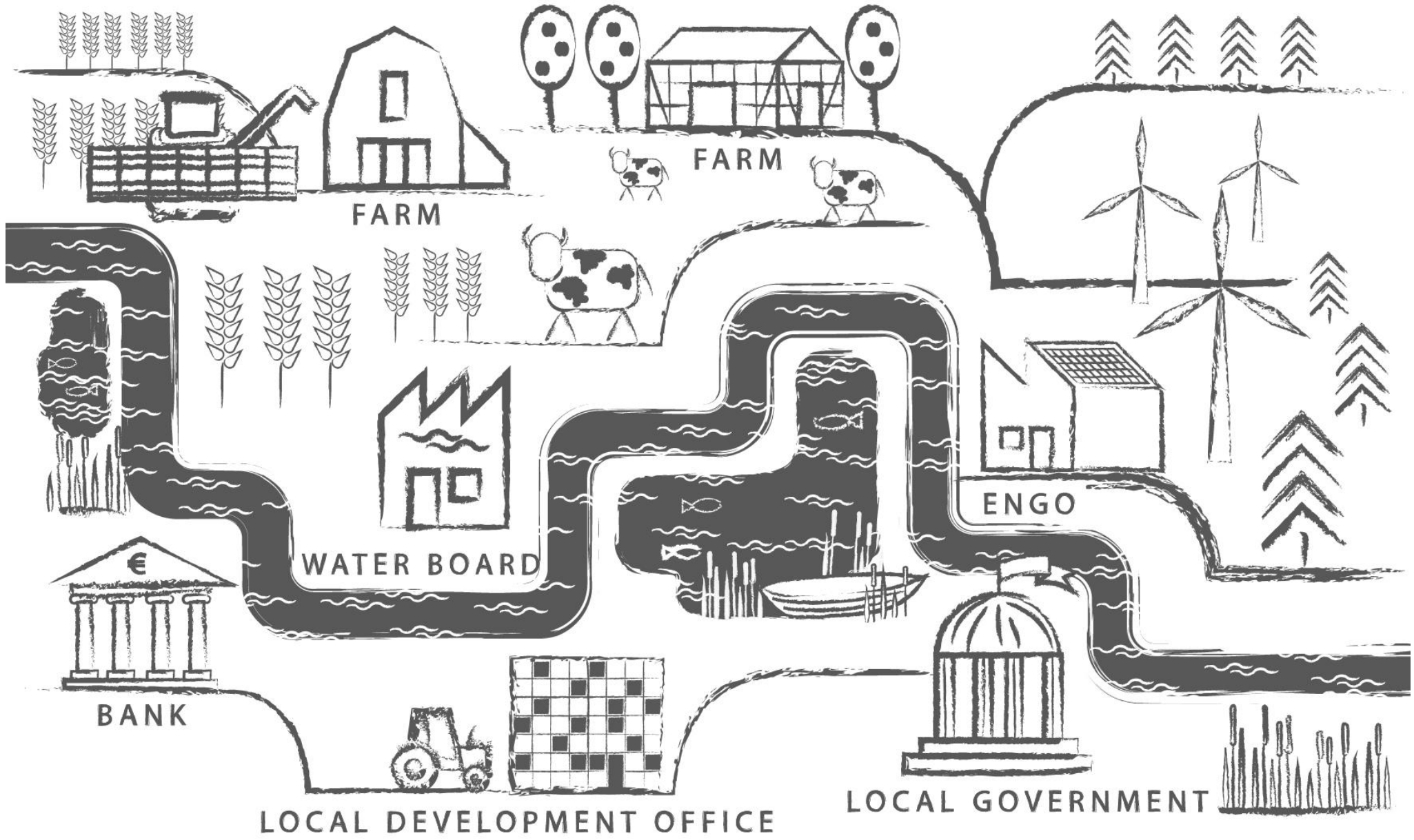
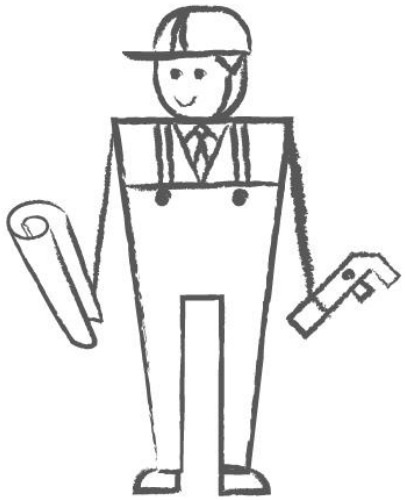


Illustration courtesy of WWF Hungary

River – shortened by more than 400 kilometers

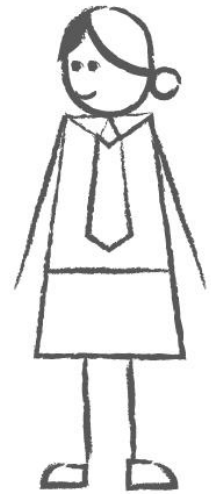
Floodplain Area – squeezing the channel between the dikes from 38500 km^2 to 1800 km^2 (90%).


FARM
FARM
WATER BOARD
ENGO
BANK
LOCAL DEVELOPMENT OFFICE
LOCAL GOVERNMENT



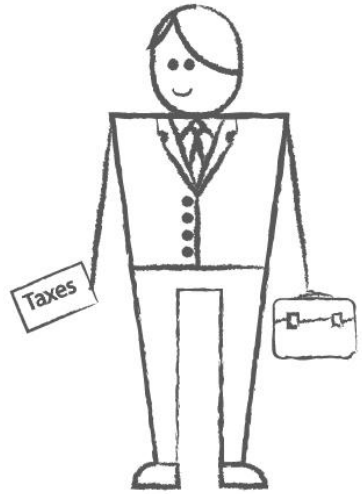
Water Board

Environmental Non-Governmental Organization (ENGO)

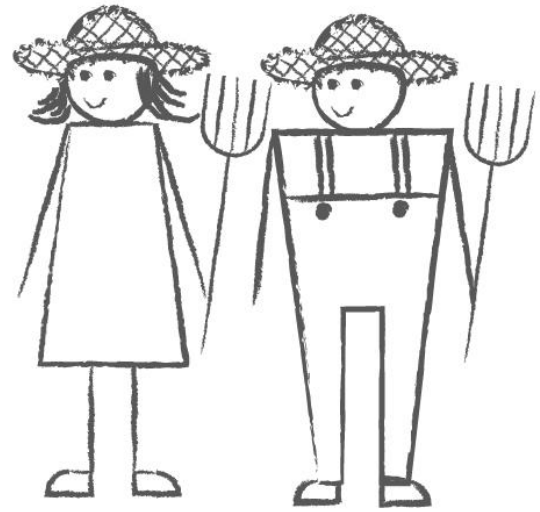


Local Development Office (LDO)

Bank



Local Government



Farmers


6
2

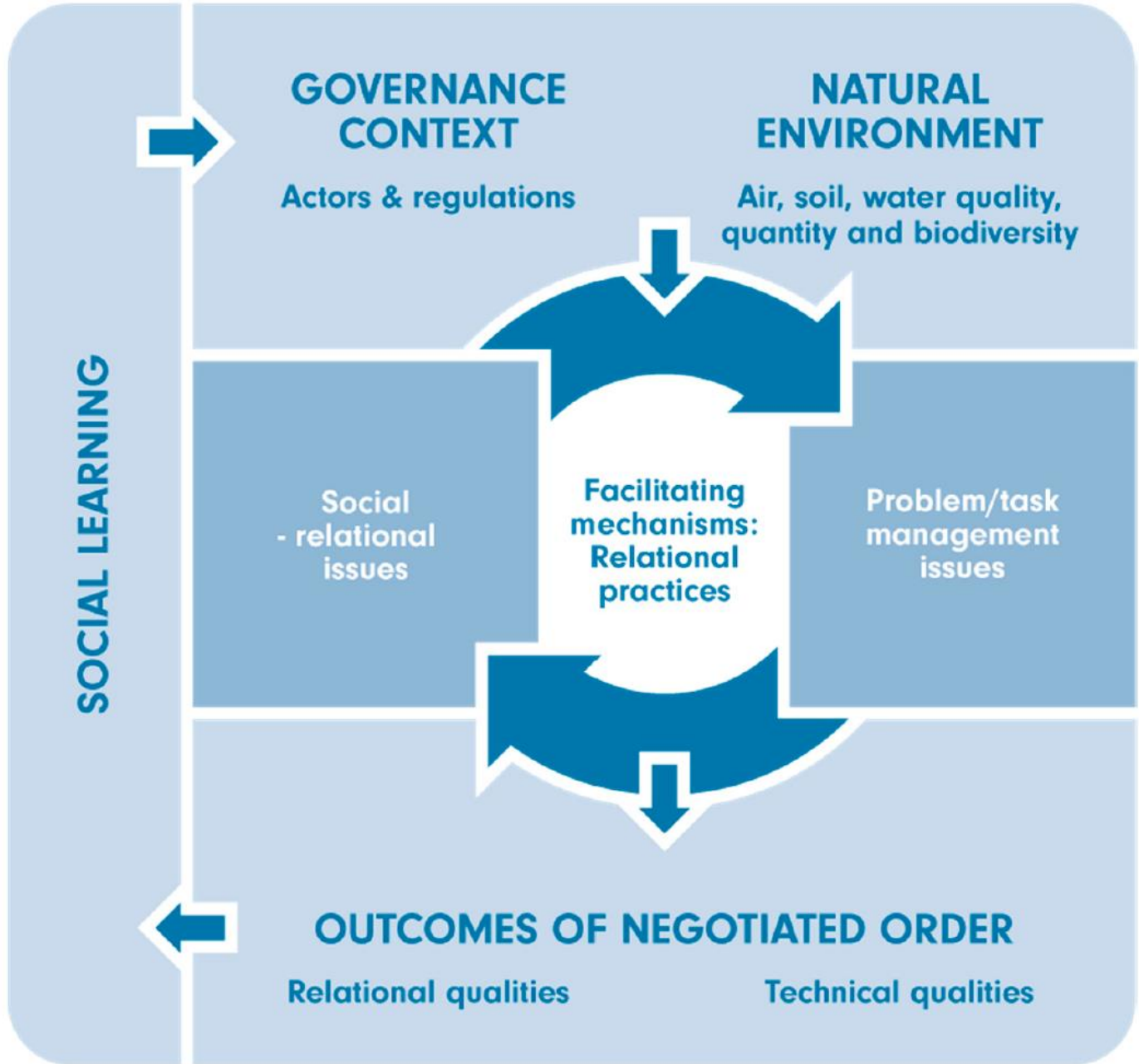


Figure 1. Social learning cycle through multi-party collaboration on natural resources [14] (p.149).

Hypotheses

1. Groups that allow/stimulate all members to **share information**, express their understanding of the problem, and build a shared reality are better able to cope with inherent system complexity; thus, they achieve better content outcomes.

2. Having a **leader** that is both **process- and outcome-oriented** facilitates the processes of defining the problem and agreeing upon solutions, which, therefore, leads to better content outcomes.

3. **Stereotyping** and lack of **ground rules** to facilitate interactions make conflict management more difficult; as a result, it lowers the chance of developing common solutions and negatively affects content outcomes.

4. The ability of the group to formulate and agree upon **a common solution** leads to better content outcomes.

Observation Protocol

1. How would you evaluate communication between teams regarding identifying, understanding, and solving the problem of the Valley (bilateral vs whole group)?
2. Is there a clear leader?
3. What is the main focus of the leader (group proces vs problem solving)?
4. Do actors share information specific for their roles?
5. How would you evaluate interactions between teams (competition vs cooperation)?
6. Can you observe conflicts?
7. Can you observe stereotyping?
8. Describe the internal dynamics of the team you are observing—how are they making decisions, sharing information, and delegating tasks?
9. How were the actors dealing with uncertainty and risk?
10. Other interesting observations

Observations for Stereotypes - Examples

”Government was initially distrusted by farmers.”

“Role of the government as a money source.”

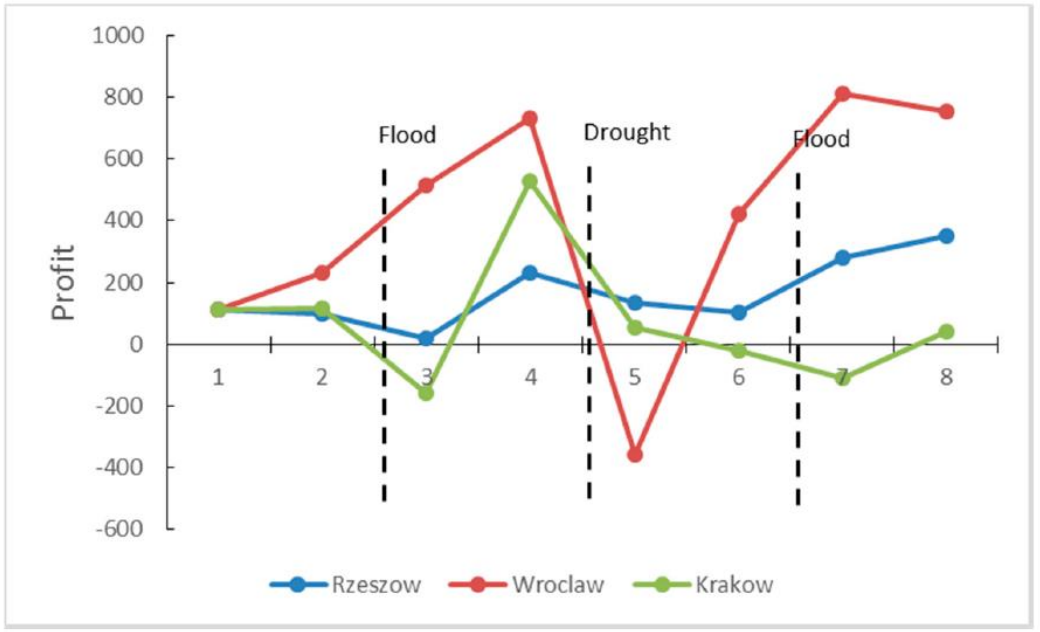
“Thought that the government is greedy.”

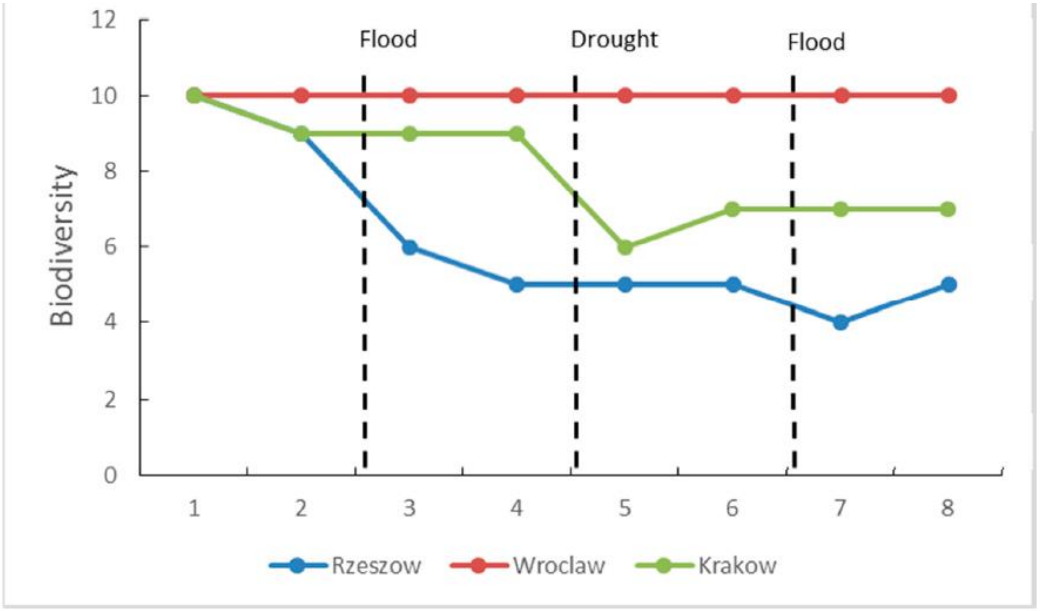
“Farmers are poor and not environmentally friendly.”

“I don’t like the Bank, they are bloodsuckers (. . .) Those blood suckers, those bank people ... you like them?”

Game Results

Hypothesis	Summary of Observations
Hypothesis 1. *Groups that allow/stimulate all members to share information, express their understanding of the problem, and build a shared reality are better able to cope with inherent system complexity, and thus achieve better content outcomes.*	The Wrocław group scored high on information sharing, much better than other groups. The difference between the groups with respect to achieving the common problem definition was not pronounced.
Hypothesis 2. *Having a leader (leaders) that is (are) both process- and outcome-oriented facilitates the processes of defining the problem and agreeing on solutions, therefore leading to a better content outcomes.*	The leadership effect was observed throughout the game in the Wrocław case. It emerged naturally (NGO) or was discussed, agreed and transferred between the roles. It allowed the whole group to get through the crisis caused by floods and droughts.
Hypothesis 3. *Stereotyping and/or lack of ground rules facilitation of interactions makes conflict management more difficult; as a result, it lowers the chance of developing common solutions and negatively affects content outcomes.*	Wrocław case was the only one where facilitation was present and this group was definitely better organized than other cases; however, establishment of the ground rules was not recorded. The intensity of stereotyping was similar between the cases.
Hypothesis 4. *The ability of the group to formulate and agree on a common solution leads to better content outcomes.*	An agreement on a common solution was reached only in the Wrocław case.





water

MDPI

Article

Exploring the Role of Relational Practices in Water Governance Using a Game-Based Approach

Piotr Magnuszewski [1,2,*], Karolina Królikowska [2,3], Anna Koch [2], Michal Pająk [2,4], Craig Allen [5], Victoria Chraibi [6], Anil Giri [7], Danielle Haak [8], Noelle Hart [8], Michelle Hellman [8], Donald Pan [9], Nathan Rossman [10,11], Jan Sendzimir [12], Maggi Sliwinski [8], Joanna Stefańska [2], Tharsi Taillieu [13], Denise Marie Weide [10,14] and Ilonka Zlatar [8]

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A Gaming Exercise to Explore Problem-Solving versus Relational Activities for River Floodplain Management

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[3]*Research Institute for Soil Science and Agricultural Chemistry of the Hungarian Academy of Sciences, Budapest, Hungary*
[4]*Association for Living Tisza, Hungary*
[5]*University of Leuven, Leuven, Belgium*

ABSTRACT

This paper describes a new gaming tool that allows players (e.g. water managers and farmers) to explore the consequences of their interactions in managing river floodplains. To facilitate the process of creating and testing new policies that would help to accommodate disordering events, e.g. floods, we developed a system dynamics model of floodplain agriculture that drives an interactive game. The Floodplain Management Game can be used as an educational resource, knowledge elicitation technique or transition management tool for agriculture and river management. The key feature is that it unites technical (problem-solving) and relational issues in one game. In multiple areas it has proven a useful tool for participants to experience the challenges of policy-making for managing rivers as well as for floodplain agriculture and for scientists to examine how stakeholders make decisions about such options.

Received 2 August 2010; revised 3 May 2011; accepted 27 June 2011

Keywords: adaptive management; communications laboratory; floodplains; simulation games; social learning

Cascading Climate Impacts

cascades

ABOUT TOPICS BLOG PUBLICATIONS EVENTS & WORKSHOPS MULTIMEDIA

Cascading climate risks: towards adaptive and resilient European societies

Impacts of climate change – such as droughts, floods, wildfires and sea-level rise – can have knock-on effects that cross borders and continents.

These effects can escalate through security relations, international trade, financial markets, international aid operations or migration.

Our consortium will consider the risks of cross-border and cascading climate change impacts and possible mitigation and adaptation efforts.

https://www.cascades.eu/


helpdesk
assistant
+
−
SELECT THE STORYLINE TO EXPLORE
MAP
ENGAGE

INTRO:
RAW MATERIALS CHALLENGE

CASCADE OF FINANCIAL PANIC

TYPHOON OF DEMANDS

LOCUST DEVASTATING
STAKEHOLDERS' TRUST

WATER CRUNCH IN THE
WHITE GOLD TRIANGLE

helpdesk

assistant

CASCADE OF FINANCIAL PANIC

Jan 2022 — Nov — Jan 2023 — April — May — Jun — Jul 2023

ARTURO MORGANI

spokesperson

European Banks Coalition

We urge the investors to stay calm: There is no immediate danger to the European banking system.

SOCIAL MEDIA

Himari Iwamoto @Iwa-Moto

Sorry guys but I am folding my startup. I cannot afford the materials. This is #theendofadream for now at least.

#e-mobilitycanwait

Lynn Price @L_Price

#Metalcrisis hits the stock market. Time to

#cutyourlosses

Hubert Bryce @Hubbryce

I wanted to buy a new EV for my birthday. But suddenly the money i saved wont be enough. Time to buy a good ol' gas-guzzler because that's all i can afford.

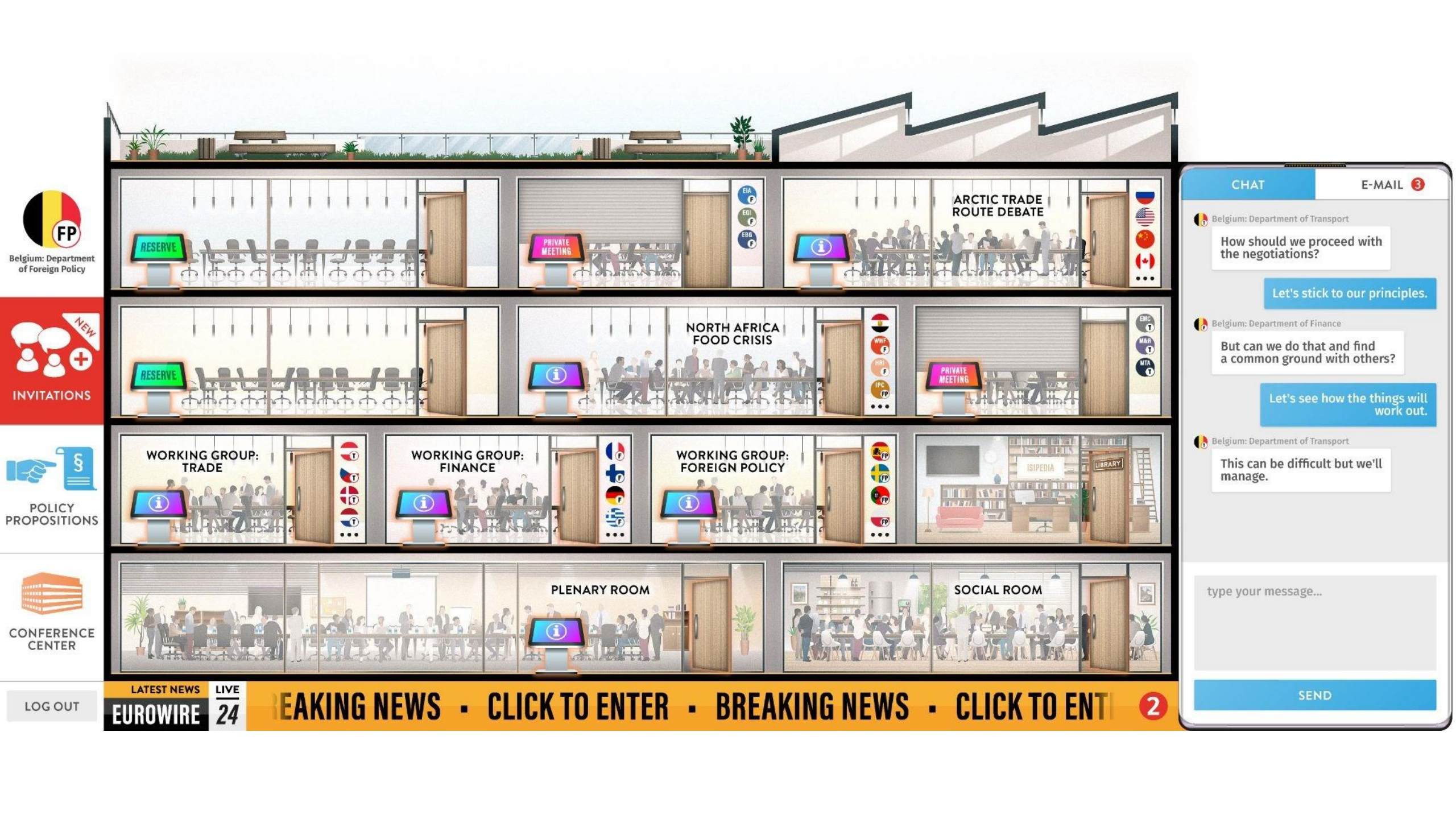
#maybenexttime #EVisbutadream

MAP

ENGAGE

TO READ ▪ PRESS ▪ CLICK TO READ ▪ PRESS ▪ CLICK TO READ ▪ PRESS ▪ CLICK TO READ ▪ PRESS ▪ CLICK TO READ ▪ PRESS

3


Belgium: Department of Foreign Policy
INVITATIONS
NEW
POLICY PROPOSITIONS
CONFERENCE CENTER
LOG OUT
RESERVE
PRIVATE MEETING
ARCTIC TRADE ROUTE DEBATE
RESERVE
NORTH AFRICA FOOD CRISIS
PRIVATE MEETING
WORKING GROUP: TRADE
WORKING GROUP: FINANCE
WORKING GROUP: FOREIGN POLICY
ISIPEDIA
LIBRARY
PLENARY ROOM
SOCIAL ROOM
LATEST NEWS
EUROWIRE
LIVE 24
EAKING NEWS · CLICK TO ENTER · BREAKING NEWS · CLICK TO ENT
2
CHAT
E-MAIL 3
Belgium: Department of Transport
How should we proceed with the negotiations?
Let's stick to our principles.
Belgium: Department of Finance
But can we do that and find a common ground with others?
Let's see how the things will work out.
Belgium: Department of Transport
This can be difficult but we'll manage.
type your message...
SEND

helpdesk

assistant

Kingdom of Denmark - Department of Supply & Value Chains (SVC)

MAP

INVITATIONS

POLICY PROPOSITIONS

CONFERENCE CENTER

NEW MESSAGES (0)

We are in favor of freedom. However, we are also in favor of Justness.

0 replies

Reduced number of cars in the streets also have great side effects: more livable cities, with less traffic and congestion, and more public space available.

0 replies

International Association for Electric Vehicles

Electric cars were supposed to be the remedy for many problems, and now, when they are more accessible, and people finally become convinced, you want to introduce limits...

0 replies

We have to consume less, so we don,t have to worry about running of metals

0 replies

Have you seen what is happening in DRC or China? Do we really need so many cars?

0 replies

International Association for Electric Vehicles

Well, DRC is a developing country which needs funds. Limits will - maybe not kill, but - diminish their export.

0 replies

International Association for Electric Vehicles

A quote from e-mail I just got from Green Tech Association:

0 replies

There has to be another path for them, for us, for the sustainable future...

0 replies

International Association for Electric Vehicles

"A strict blanket regulation on car ownership will result in a lot of losers should it be enacted."

0 replies

Congo Republic - SVC

Corruption and mafia control of the primary energy source, charcoal is hampering progress in the DRC

0 replies

write a message...

SEND

NG METALS' DEMAND

CLOSE INVITE LEAVE

LATEST NEWS LIVE

GLOBALWIRE 24

News coming soon

E-MAIL

Green Tech Association 12:07:21

We need regulations that are adapted to local conditions

Dear Participant,

It is true that there are more and more cars in the streets, which are contributing heavily to air pollution and carbon emissions. In fact, some cities have already imposed car ownership regulations and are already reaping the benefits. But we also have to remember that not everyone is in the same situation or has the same capacities. A strict blanket regulation on car ownership will result in a lot of losers should it be enacted.

We should not be hasty in imposing regulations until we at least have an idea of the potential scope of their impacts in the short and long term, and adopt regulations adapted to local conditions.

We hope that you consider these arguments when making your decision.

Yours sincerely,
Board of Directors
Green Tech Association

RETURN

Cascading Climate Impacts

Chile: Social Justice Department

INVITATIONS

POLICY PROPOSITIONS

CONFERENCE CENTER

LOG OUT

ENVIRONMENTAL & SOCIAL STANDARDS

The high price of critical raw materials, short-term profit maximization, and a lack of global labor and environmental standards harm the environment and societies in certain regions. Furthermore, because the supply of critical raw materials is low, countries and companies turn a blind eye to those violations so they can continue producing green transition technologies without impediments. The policies proposed below aim to improve this situation.

1. UNIFIED, GLOBAL LABOR STANDARDS IN THE MINING SECTOR FOR INCREASED WORKERS' PROTECTION

MORE ▾

YES	8
NO	5

2. A LEGAL FRAMEWORK GRANTING LOCAL COMMUNITIES DECISION POWER ON MINING IN THEIR LOCATIONS

MORE ▾

YES	6
NO	7

3. UNIFIED, GLOBAL ENVIRONMENTAL AND HEALTH STANDARDS FOR MITIGATING THE IMPACTS OF THE MINING SECTOR ON PEOPLE AND NATURE

MORE ▾

YES	10
NO	3

TRANSPARENCY IN THE MINING SECTOR

The demand for critical raw materials is expected to grow dramatically, while its supply will be more and more challenging. This fact, coupled with uncertainties resulting from geopolitical tensions, brings about huge market volatilities and encourages speculation and protectionism. As a result, both investors and traders find it very difficult to plan ahead, so new investments are lagging behind the dramatically growing demand, which puts the entire energy transition at risk. The policies proposed below aim to improve this situation.

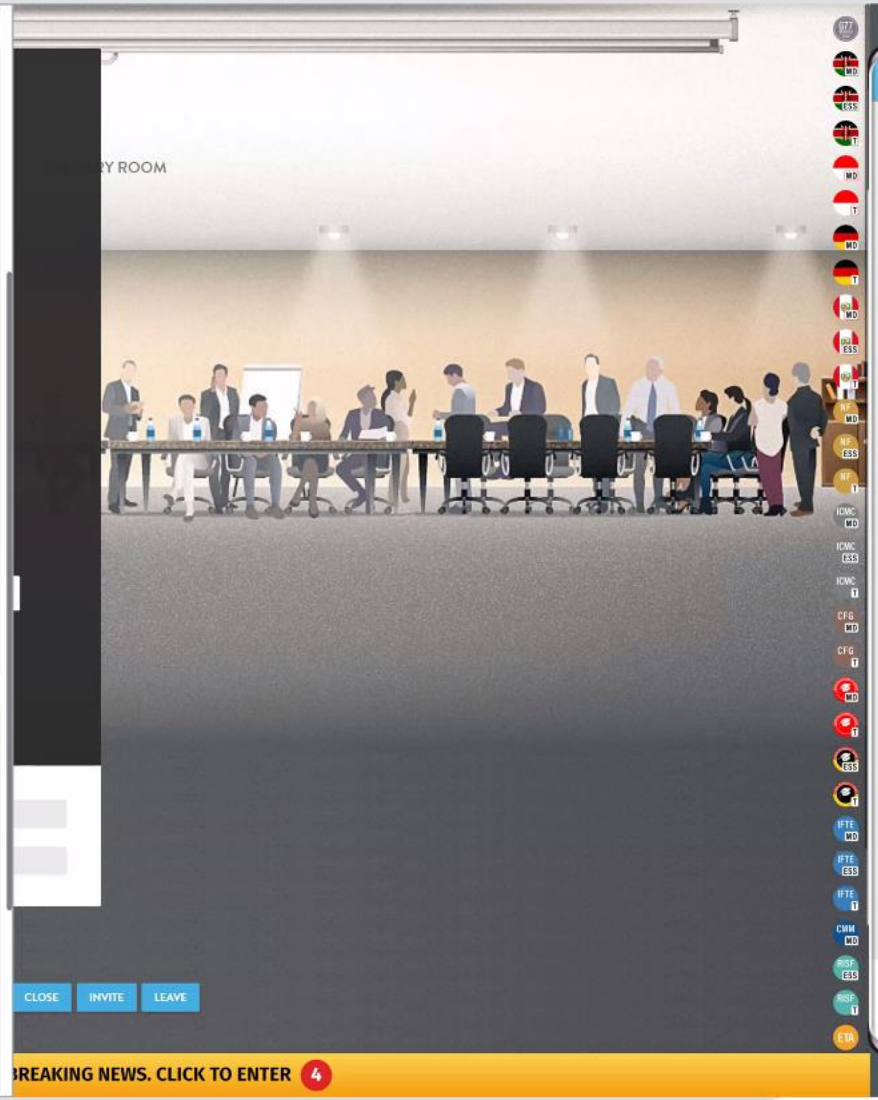
1. A MANDATORY PROGRAM ESTABLISHING A SPECIAL BODY TO FULLY TRACE SOURCES OF MINERALS

MORE ▾

YES	9
NO	4

2. MANDATORY DISCLOSURE OF INVESTMENTS FOR FINANCIAL ACTORS (BANKS, INVESTMENT FUNDS)

MORE ▾



CHAT | E-MAIL

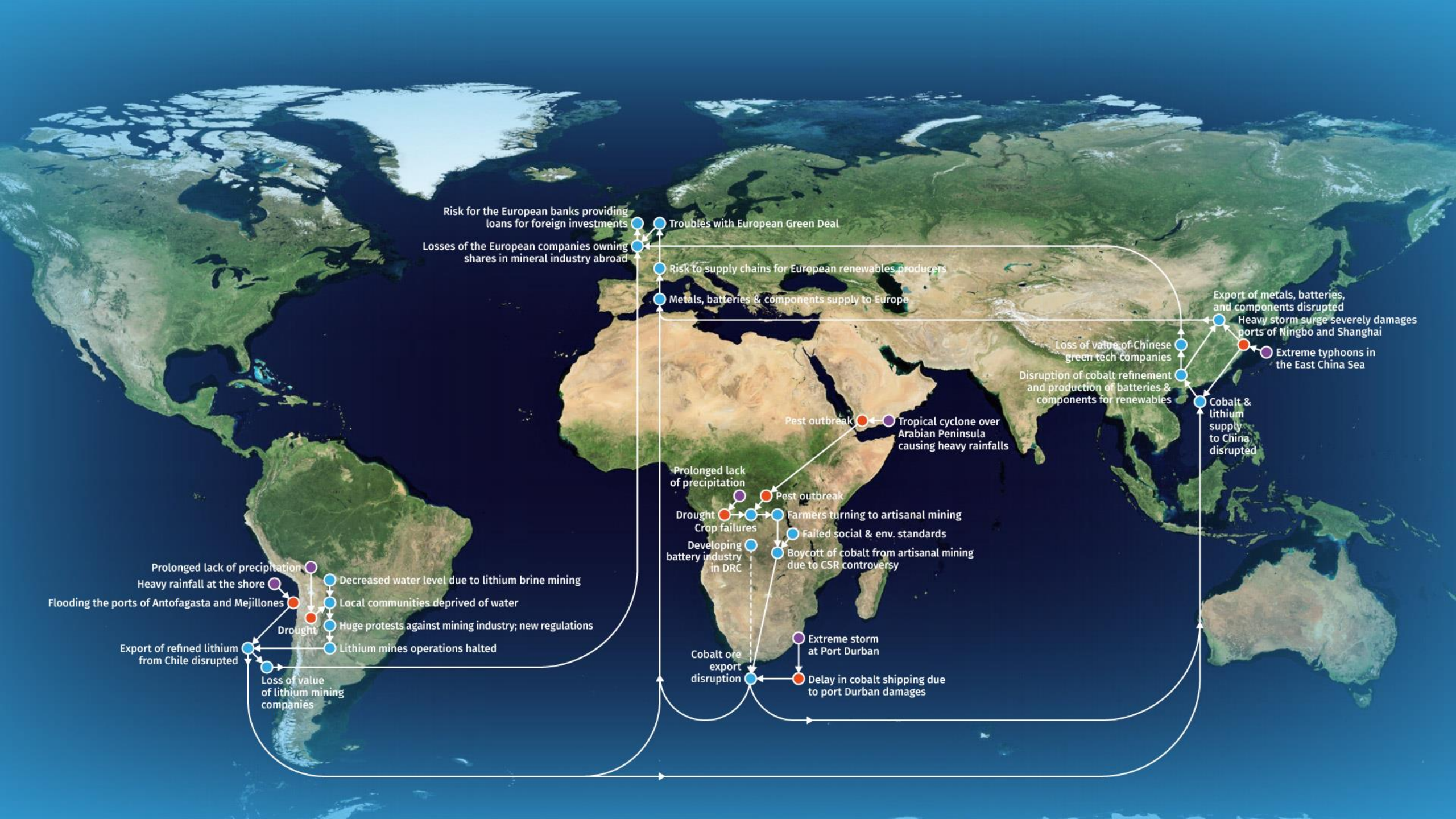
Chile: Ministry of Environment

I think we need a strong voice coming out of this meeting to ensure environmental standards are being met including social considerations.

Chile: Ministry of Energy Transition

But what about the other two? We believe that flexibility in the market is important for innovation in battery technologies and other critical technologies for the energy transition.

write a message... SEND


Risk for the European banks providing loans for foreign investments
Troubles with European Green Deal
Losses of the European companies owning shares in mineral industry abroad
Risk to supply chains for European renewables producers
Metals, batteries & components supply to Europe
Export of metals, batteries, and components disrupted
Heavy storm surge severely damages ports of Ningbo and Shanghai
Extreme typhoons in the East China Sea
Loss of value of Chinese green tech companies
Disruption of cobalt refinement and production of batteries & components for renewables
Cobalt & lithium supply to China disrupted
Pest outbreak
Tropical cyclone over Arabian Peninsula causing heavy rainfalls
Prolonged lack of precipitation
Pest outbreak
Drought
Crop failures
Farmers turning to artisanal mining
Failed social & env. standards
Developing battery industry in DRC
Boycott of cobalt from artisanal mining due to CSR controversy
Prolonged lack of precipitation
Heavy rainfall at the shore
Flooding the ports of Antofagasta and Mejillones
Drought
Decreased water level due to lithium brine mining
Local communities deprived of water
Huge protests against mining industry; new regulations
Lithium mines operations halted
Export of refined lithium from Chile disrupted
Loss of value of lithium mining companies
Extreme storm at Port Durban
Cobalt ore export disruption
Delay in cobalt shipping due to port Durban damages


Pest outbreak
Tropical cyclone over Arabian Peninsula causing heavy rainfalls
Prolonged lack of precipitation
Pest outbreak
Drought
Crop failures
Farmers turning to artisanal mining
Failed social & env. standards
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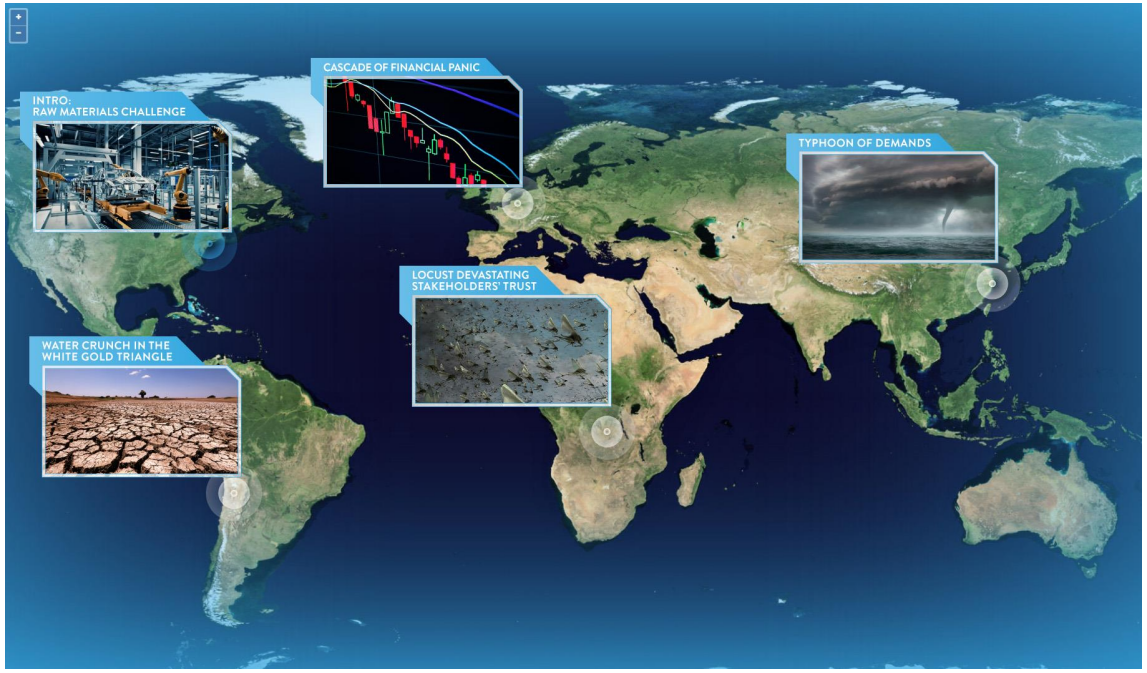
Boycott of cobalt from artisanal mining due to CSR controversy
Extreme storm at Port Durban
Cobalt ore export disruption
Delay in cobalt shipping due to port Durban damages

Future of Food

https://engage.socialsimulations.org/future-of-food-stories



Raw Materials Challenge

https://engage.socialsimulations.org/cop26


5. STAKEHOLDERS' DIALOGUE
1. REAL-WORLD PROBLEM SITUATION
2. SIMULATION CO-DESIGN
CRISIS
ACTIONS
OUTCOMES
TIMELINE
ROLES & BACKSTORIES
4. DEBRIEFING
3. SIMULATION PERFORMANCE
BREAKING NEWS
SOCIAL MEDIA
BACK-STORY
BACK-STORIES
GAMEFLOW 1→2→3→4
PATHWAYS
CRISIS
DECISIONS

SOCIAL SIMULATIONS

systemssolutions.org

socialsimulations.org

twitter.com/socsim

youtube.com/user/crspoland