

# Simulation Games

as tools  
for



handling cognitive  
and social complexity

in the context of  
**sustainability  
transition**

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Piotr Magnuszewski



International Institute for  
Applied Systems Analysis

“Complexity is your enemy. Any fool can make something complicated. It is hard to make something **simple.**”



*Richard Branson*



$$\begin{aligned} & \left( \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \right)^T \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \left( \frac{1}{\sqrt{2}} \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \right) \\ &= \frac{1}{2} \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \\ &= \frac{1}{2} \begin{bmatrix} 2 & 0 \\ 0 & 2 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \\ &= \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix} \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \\ &= \begin{bmatrix} 1 & 1 \\ 1 & -1 \end{bmatrix} \end{aligned}$$

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**Keep  
It  
Simple**

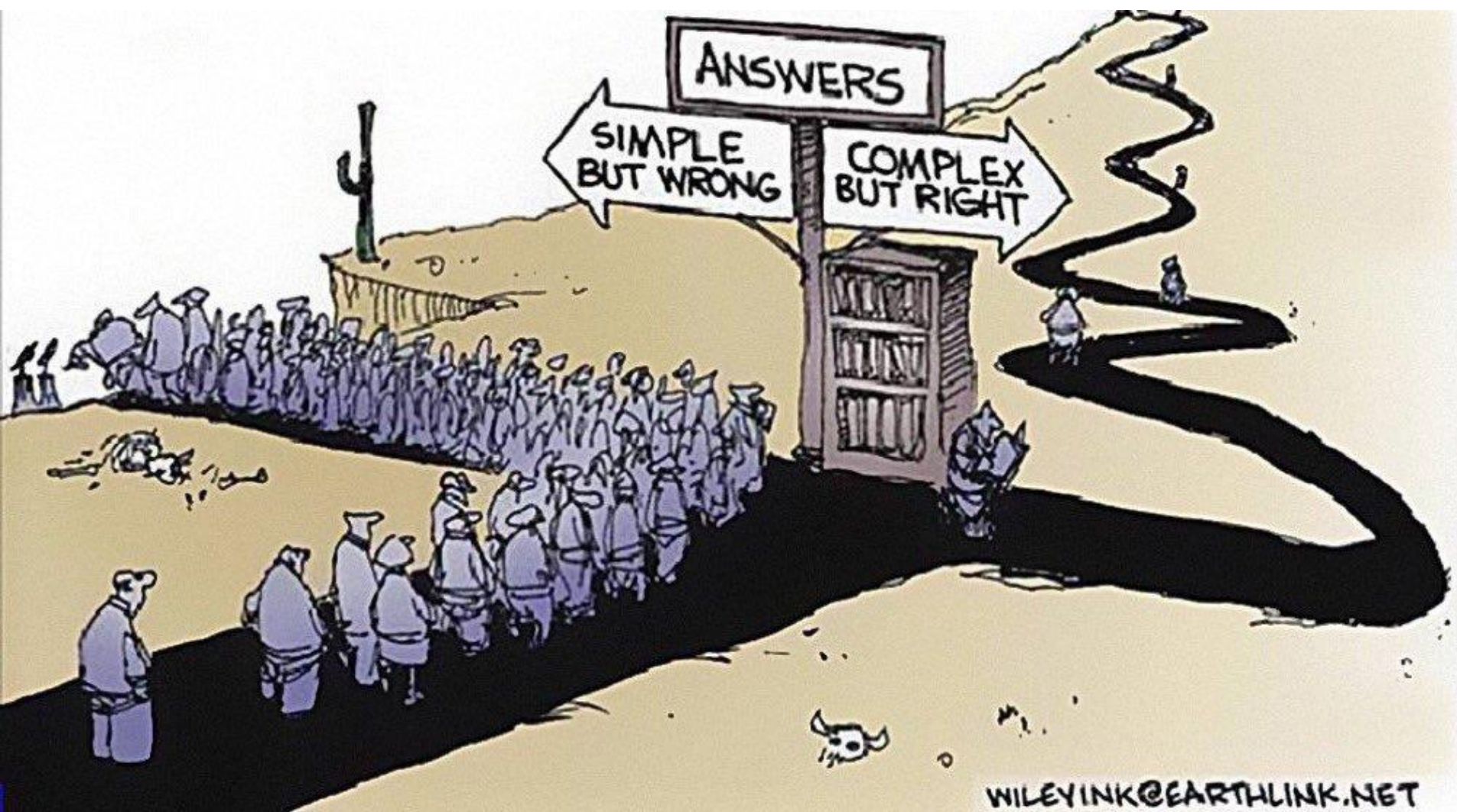


**FOX  
NEWS**  
LIVE

**RPT: GLASS OF RED WINE  
EQUIVALENT TO HOUR OF GYM TIME**

**SUNDAY**  
Housecall





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# Complexity



**Uncertainty**

# Ambiguity

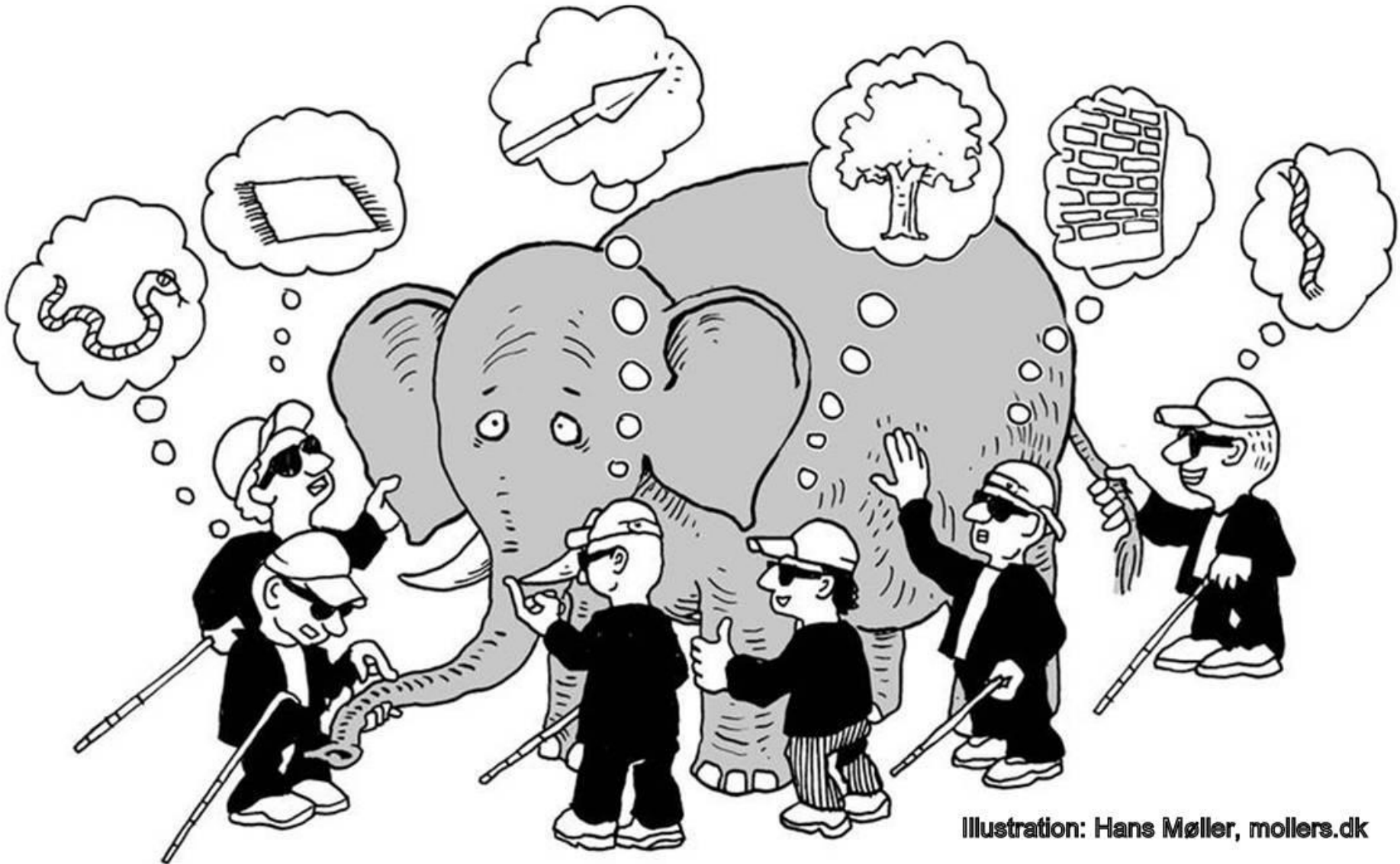
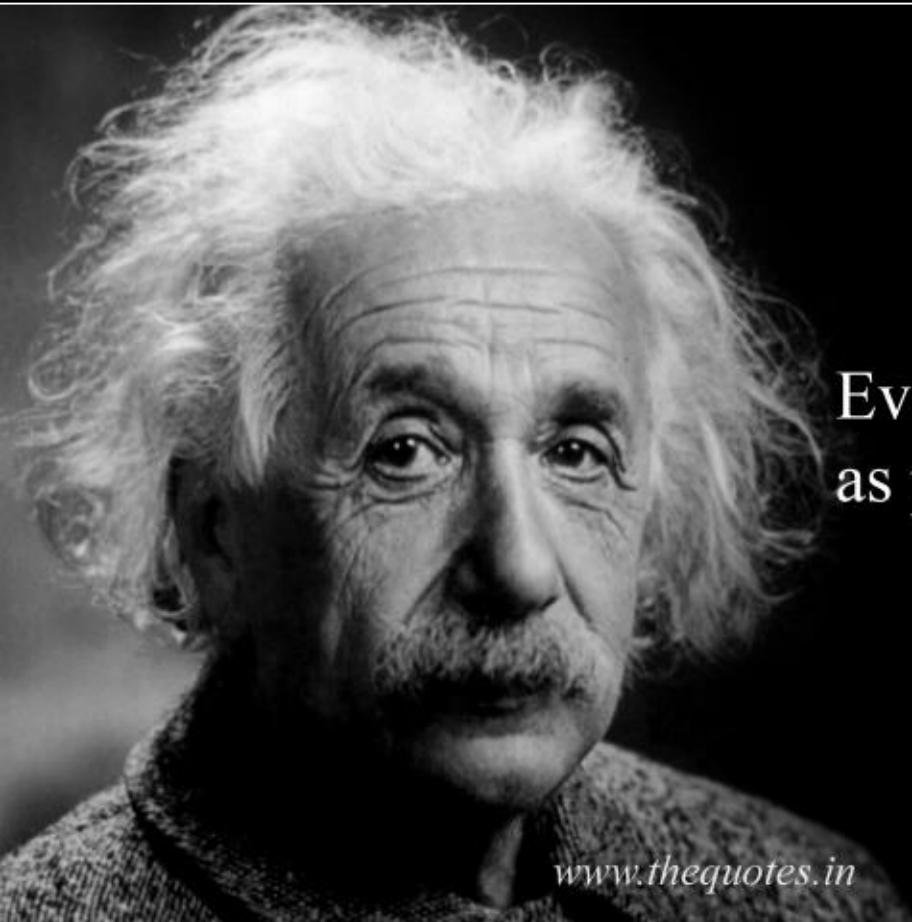


Illustration: Hans Møller, mollers.dk



# POLITICS





Everything should be made as simple as possible, but not simpler.

*Albert Einstein*

[www.thequotes.in](http://www.thequotes.in)







**Games?  
Seriously?**



**Hell yeah!!!**

# ENERGY TRANSITION GAME

The graphic part of the logo features a dark grey 3D cube on the left, connected by a thick green line to a green hexagon on the right. Inside the hexagon is a white grid pattern representing a solar panel. The green line continues from the hexagon to a dark grey electrical plug icon on the right. A dark grey electrical plug icon is also located at the bottom right of the hexagon.

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**Wuppertal  
Institut**





**Berlin**



# Świdnica Poland







**Tallinn**



Why **games** work well for  
serious **goals**?

# challenge





**immersion**







**emotions**

A close-up photograph of a person's hands working on a wooden project at a workbench. The person is wearing a light-colored, long-sleeved shirt. The workbench is cluttered with various wooden pieces, including a large rectangular block, a smaller piece being held by the person's hands, and several small wooden blocks and shavings scattered around. The lighting is dramatic, with strong highlights on the hands and the wood, and deep shadows in the background. The overall scene conveys a sense of focused craftsmanship and hands-on learning.

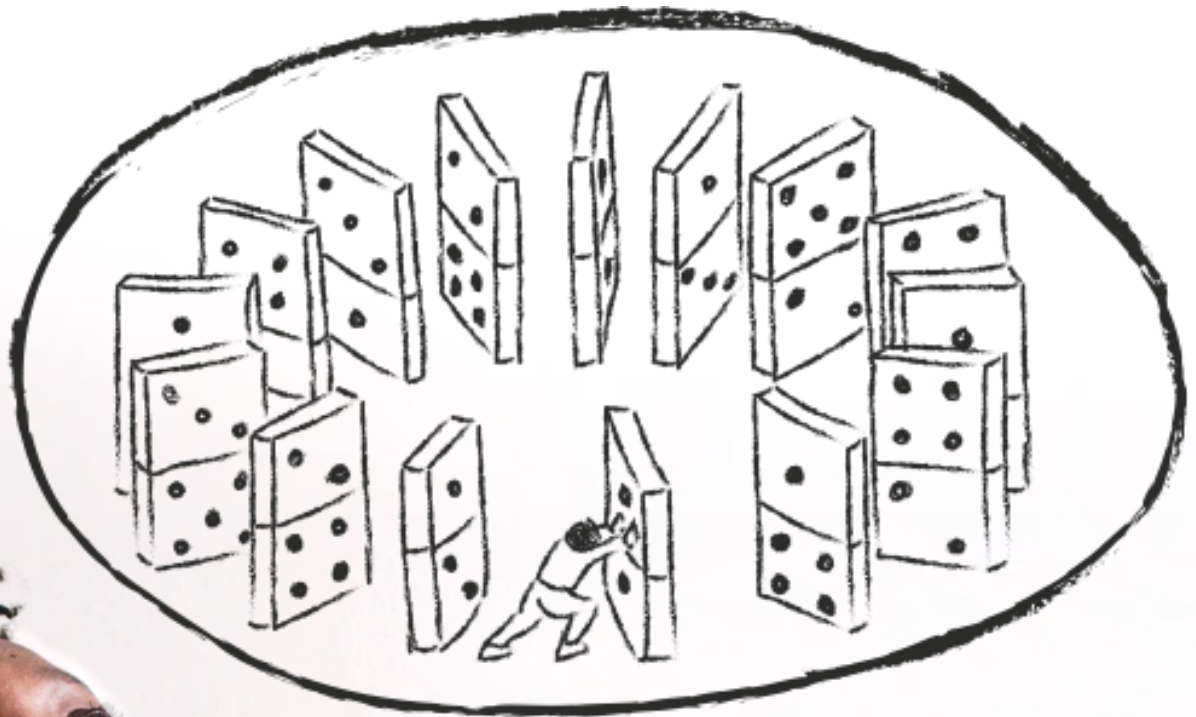
**learning by  
doing**



**Failsafe**

**Environment**

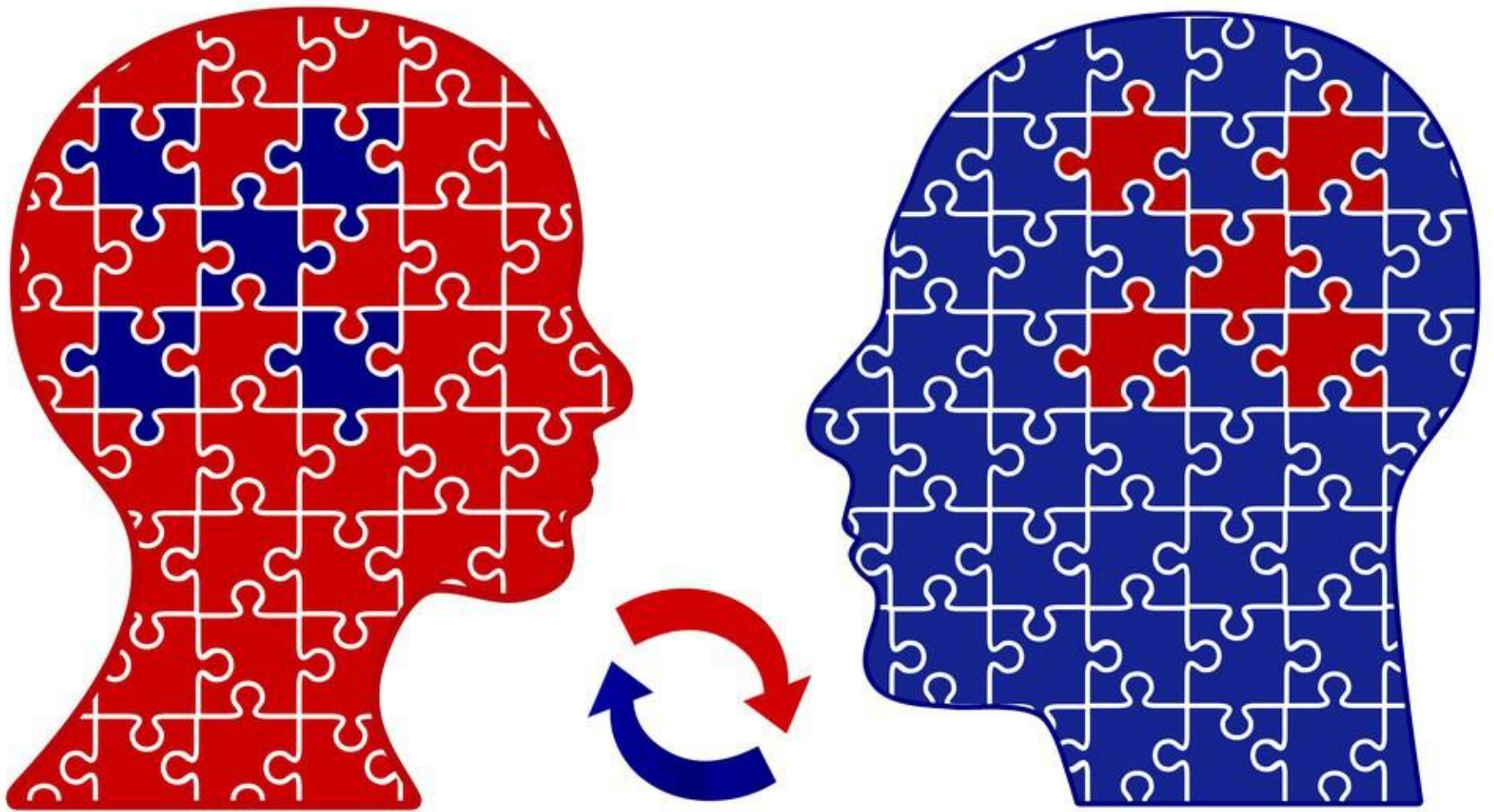




**systems**  
thinking



# Empathy Machine







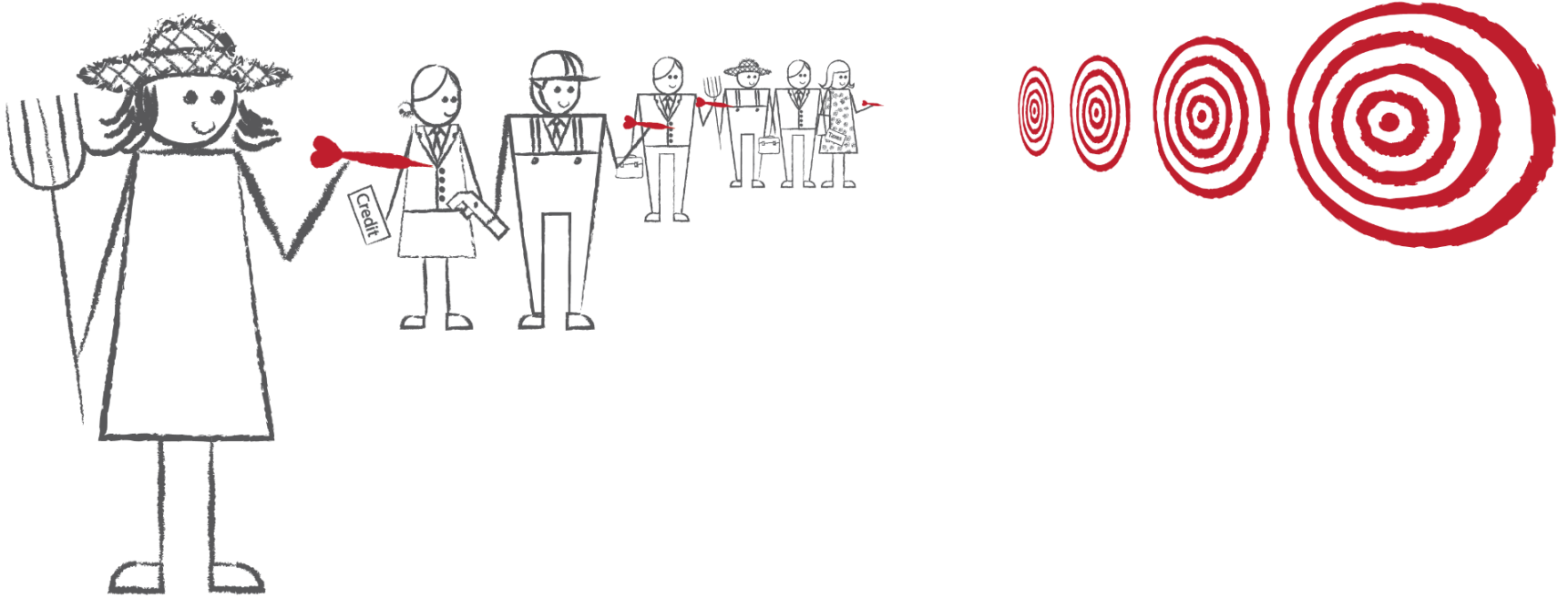


**Social Simulation ...**



**... not a Game**

# Think and decide



# YOUR GOALS



**Social Simulation =**

Model (including the Game World) +

Roles (including their Rules) +

Interactions (emerging through Play)

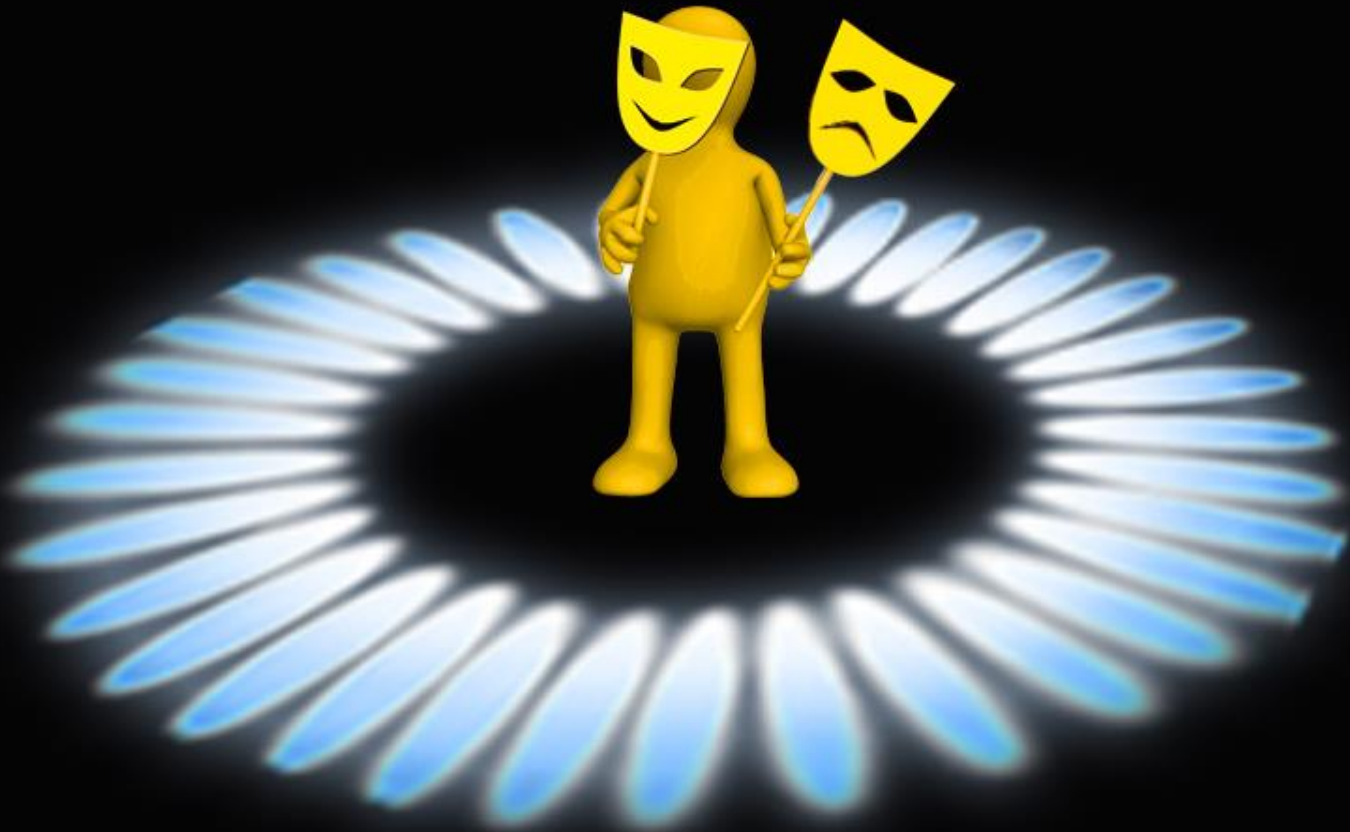


# Models

describe how things work



# Roles



simulating experience

**... constrained  
by rules**







# Interactions



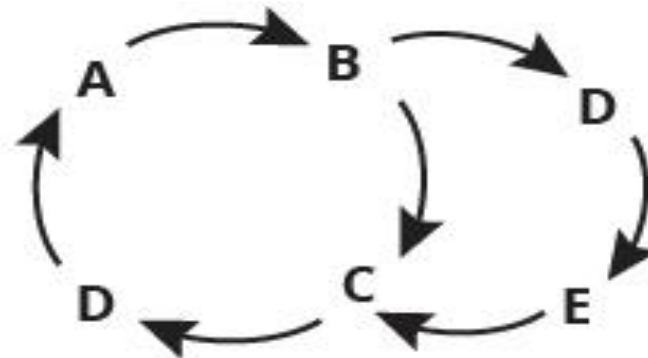
**Rules**



# Roles



**Game  
World**



# Model



**THE  
WORLD'S  
FUTURE**  
A SUSTAINABLE DEVELOPMENT GOALS GAME



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**OECD**

BETTER POLICIES FOR BETTER LIVES







# FRESHWATER - LAURENTIA

WATER TREATMENT



POLLUTION



Each (1) pollution tokens block one water token from being used.  
At the end of each round pollution is removed.

AGRICULTURE



ENERGY



DOMESTIC























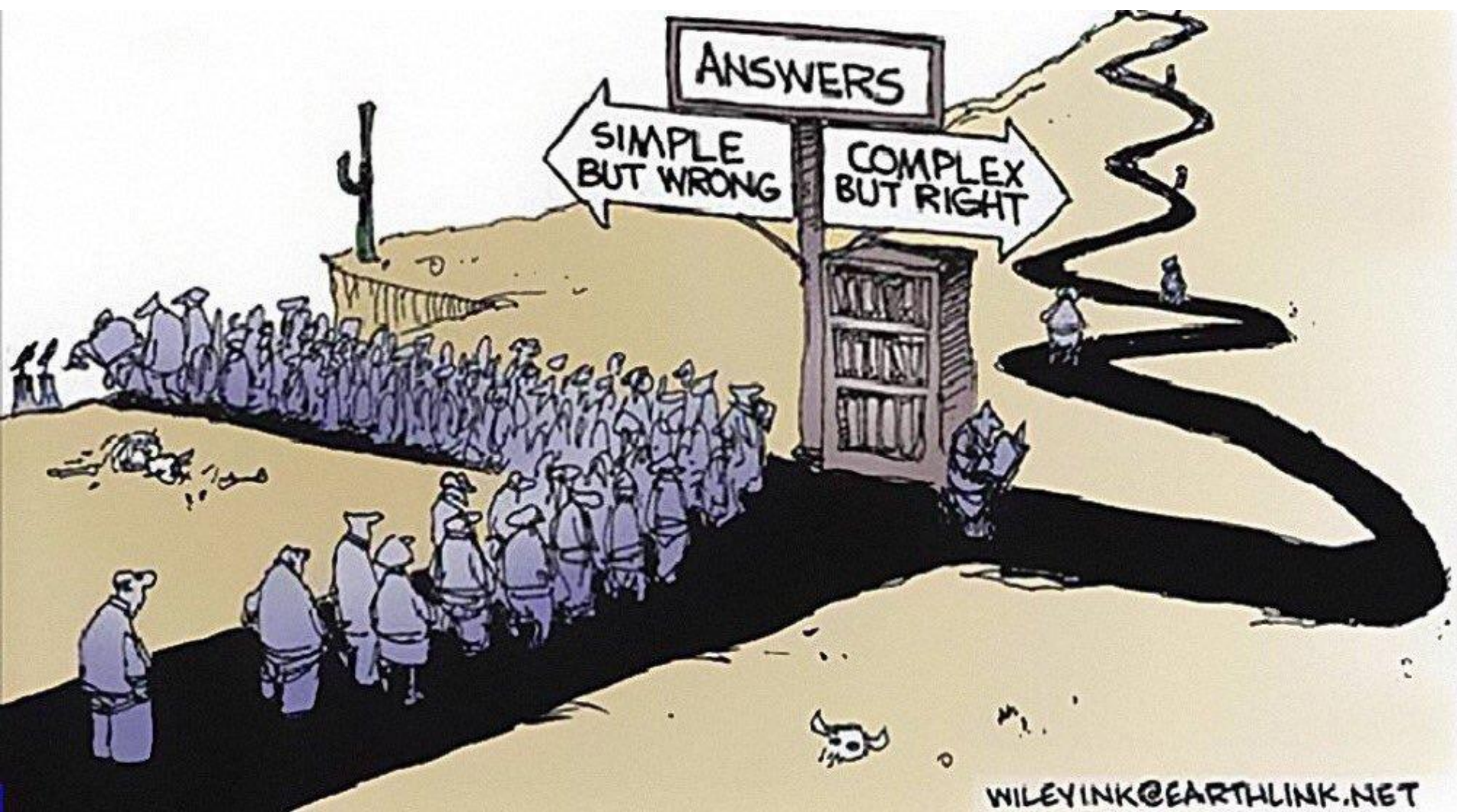


# The World's Future Game

What have you learned?

*The dynamics of decision making across the roles within systems/contexts. Reinforced interconnectedness of decisions/policies and adaptive nature of systems.*

*Policy making is messy based on imperfect understanding of the system and incentives, imperfect information of what others are doing. That said, a common understanding of the goals (i.e. SDGs) can help align actions and achieve greater coherence & better outcomes*



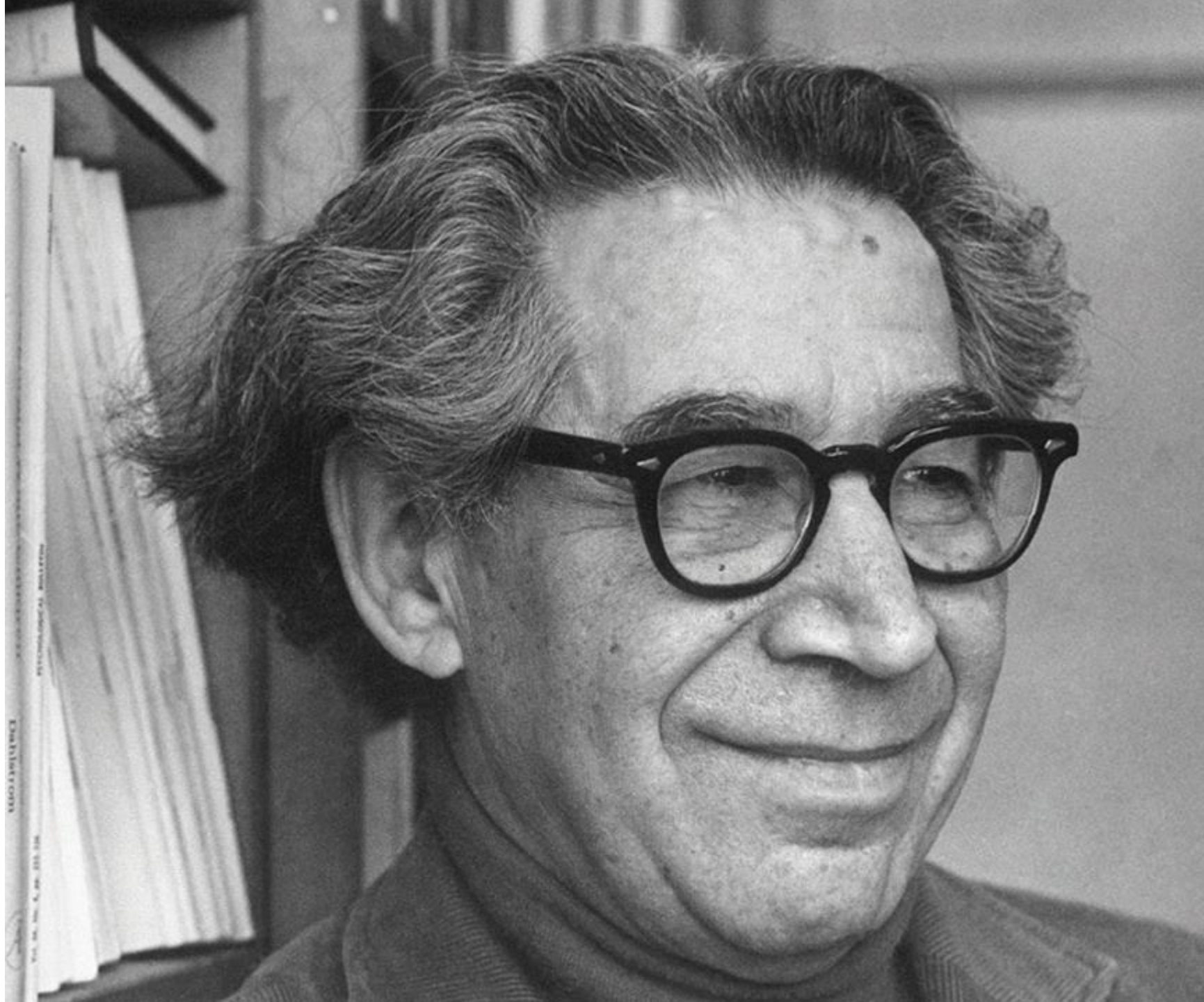
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A man with a beard and a dark cap is standing outdoors, holding a large white sign with bold black text. He is also holding a rolled-up document in his left hand. The background shows a street scene with trees and buildings.

**PREPARE FOR  
THE END OF  
THIS WORLD**









Unfortunately, this is how the brain works:

Sir! We are receiving information that conflicts with the core belief system!

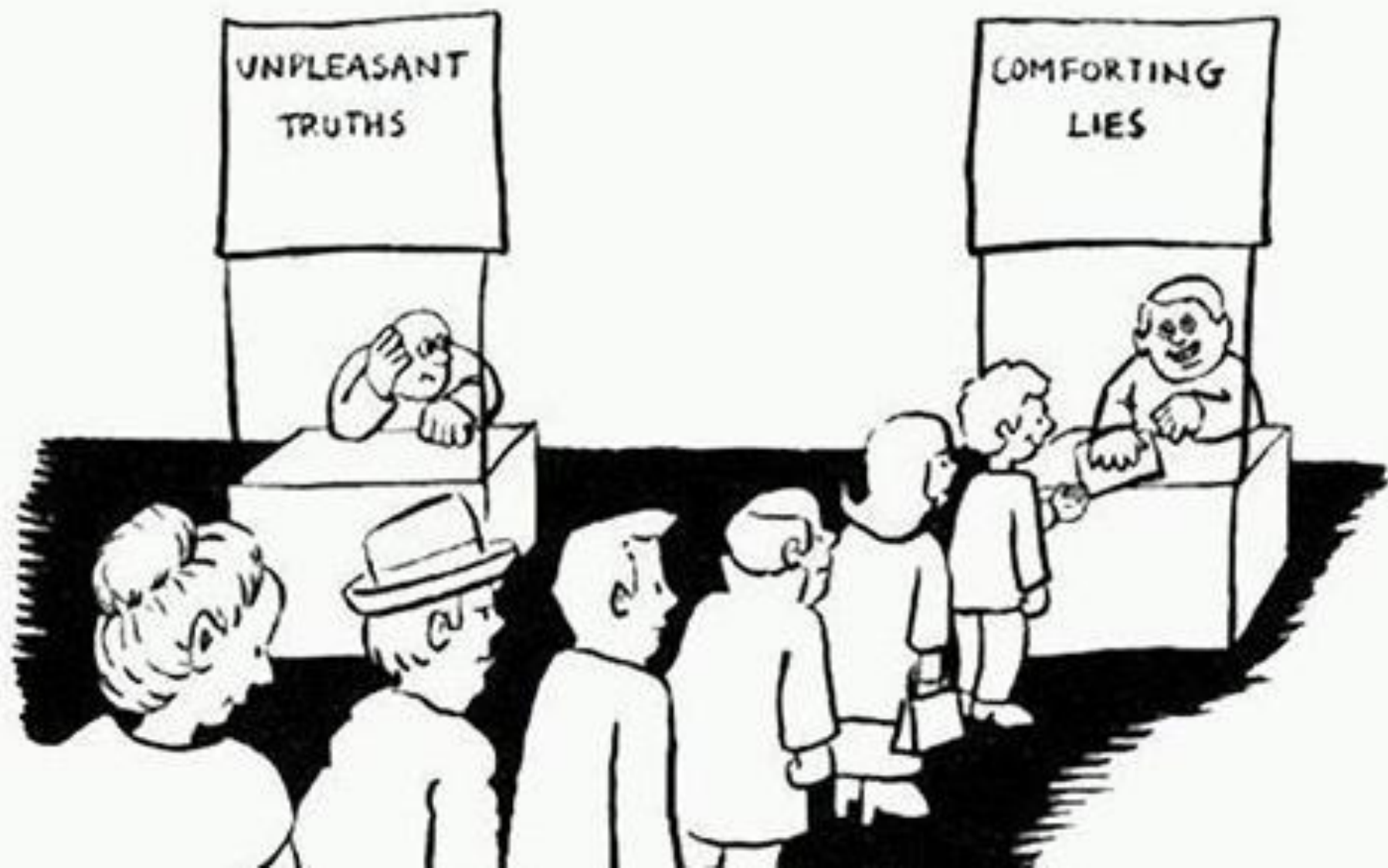
Get rid of it.

**BRACE YOURSELVES**



**WE MAY EXPERIENCE SOME TURBULENCE DUE  
TO A NEW WAVE OF COGNITIVE DISSONANCE**





**WHAT IF I TOLD YOU**



**That you can change your mind  
based on new information**





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A large blue graphic for the 'Nexus Game'. It features a gear-like outer shape with a molecular structure of six nodes connected by lines inside. Below the gear is a wavy line representing water. To the right of the graphic, the words 'NEXUS' and 'GAME' are written in a large, bold, blue sans-serif font, stacked vertically.

# NEXUS GAME

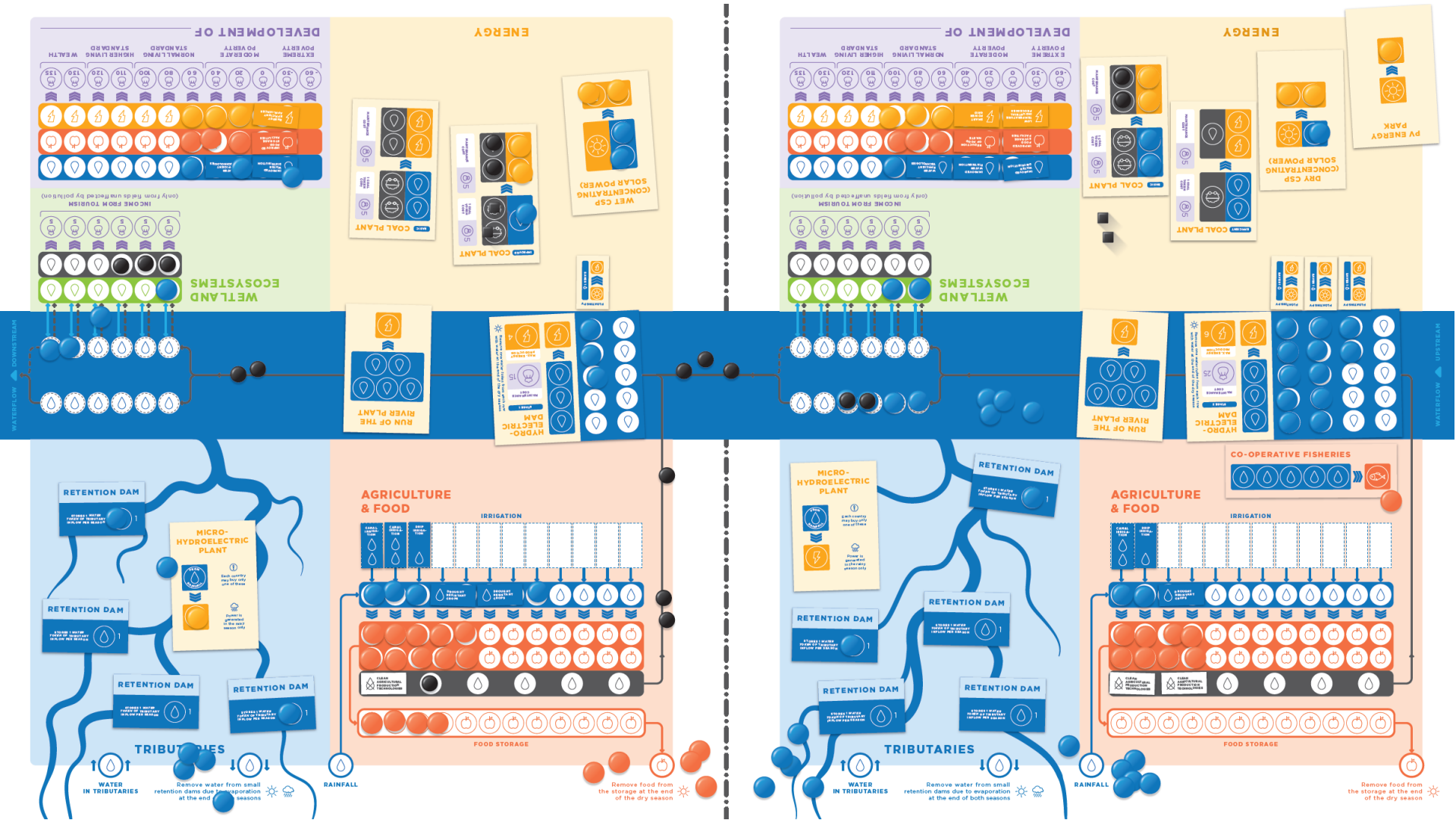


SUSTAINABLE  
ENERGY FOR ALL



AFRICAN DEVELOPMENT BANK GROUP

# The Nexus Game



Managing transboundary river with respect to the water, food and energy supply and demand



**First Test  
October 2016**



# IIASA & Austrian Development Agency March 2017, Laxenburg







**WATER, SOIL AND WASTE**




**DRESDEN  
NEXUS  
CONFERENCE**

**DNC 2017** | **SDGs & NEXUS APPROACH:  
Monitoring and Implementation**

**17-19 MAY 2017**  
DRESDEN, GERMANY

DEUTSCHES HYGIENE MUSEUM



 WATER, SOIL AND WASTE  
**DRESDEN  
NEXUS  
CONFERENCE**

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**African Development Bank  
June 2017, Abidjan**

# African Development Bank June 2017, Abidjan





# Nexus Game Evaluation



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

Can playing this game affect policy with regard to Nexus challenges?



*Yes, as an eye-opener for people in the 3 sectors as well as for people outside the sectors; highlighting the need for multipurpose development of water resources.*

# Water-Food-Energy Nexus Game



Qualitative study of effects observed by participants  
(evaluation questionnaire)

## **Learning from the game:**

Systems thinking – 25

Governance, leadership, cooperation – 20

Other: economics, technologies, spatial issues, attitudes,  
skills, uncertainty

## **Potential game effects on policy:**

Improve cross-sectoral and trans-boundary collaboration – 12

Better decision-making – 12

Engage stakeholders in dialogue – 8



# Simulation experience







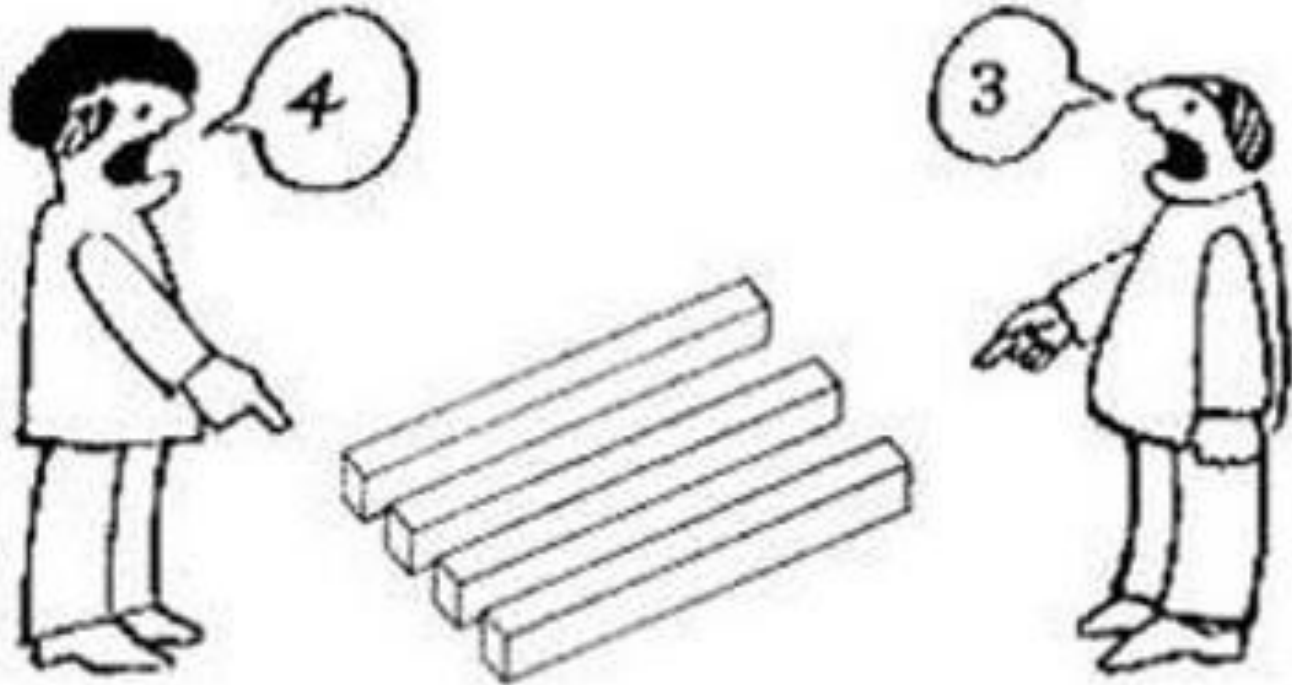
**Experiencing complexity  
of policy development  
and implementation  
for sustainability**





**... leading to Reflection**

# Understanding multiple perspectives





# Gaining system perspective: big picture

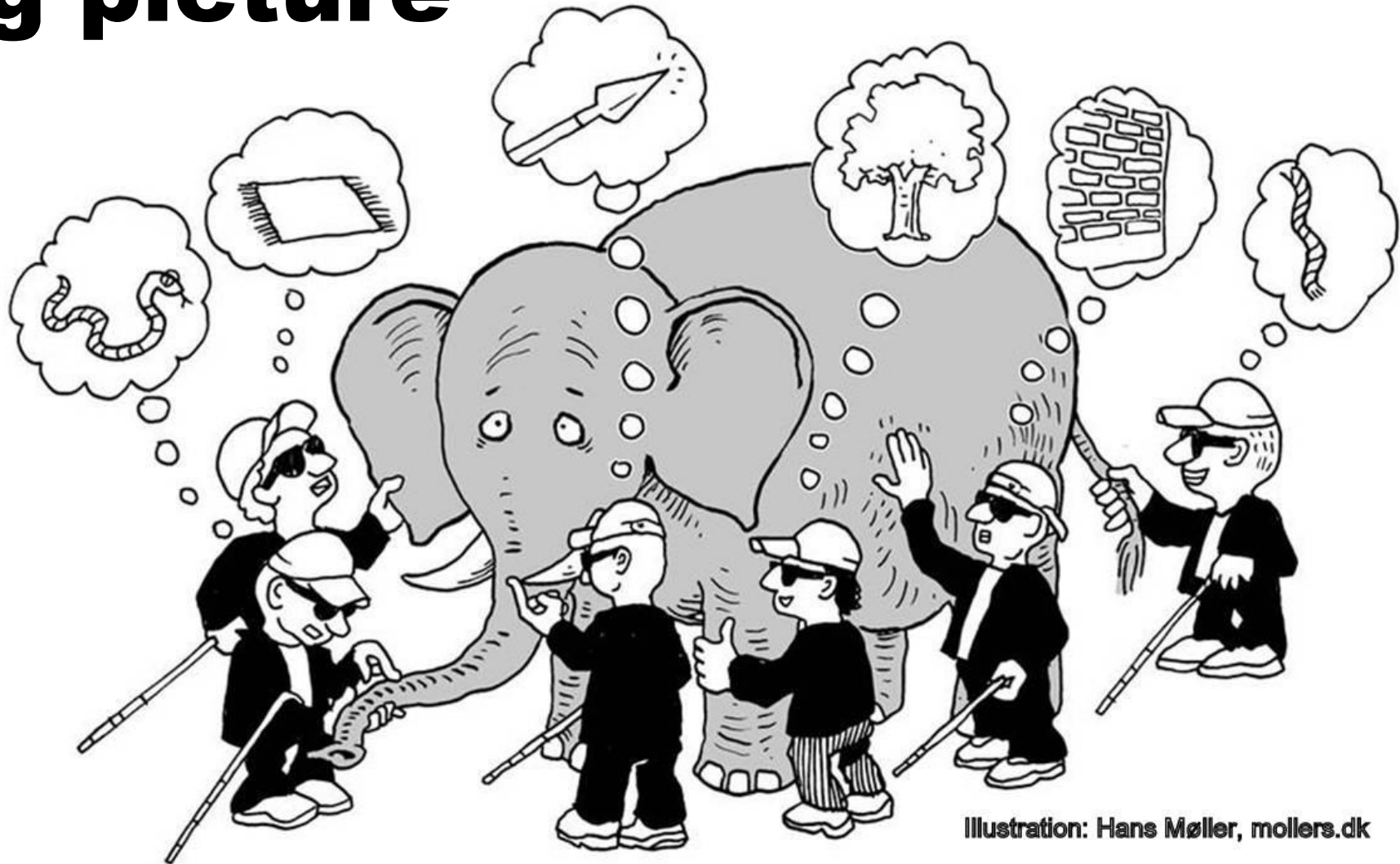


Illustration: Hans Møller, mollers.dk

"Serious Games offer themselves as one way to expand the possibility space of games [...] in a way that resists simplicity, that embraces complexity, and puts players in the meaningful roles, that engender the empathy we need to understand our world in the coming century."

**Ian Bogost**

Author, *Persuasive Games*







Let's play!



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