



Delft University of Technology

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### Publication date

2025

### Document Version

Final published version

### Citation (APA)

Cortes Arevalo, V. J., van Belzen, J., Ellen, G. J., Slinger, J., Bouma, T. J., & Vreugdenhil, H. S. I. (2025). *Serious game design uncovering the  $\Delta$  ENIGMAs for flexible and adaptive flood risk management*. Poster session presented at NCR DAYS 2025, Delft, Netherlands.

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# Serious game design uncovering the $\Delta$ ENIGMAs for flexible and adaptive flood risk management



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## A productive (learning) aim

The  $\Delta$ ENIGMA research infrastructure monitors sustained and high-resolution water and sediment dynamics to support nature-based flood management in the Dutch Delta.

- **The Productive Knowledge interaction facility** joins university labs creating interfaces (**Fig. 3 bottom**) and tools to support and document collaboration within and beyond  $\Delta$ ENIGMA.
- **This poster shows a game prototype co-developed** with support of TUDelft serious game design students (Kontaxopoulou et al., 2024) to communicate about dike-wetland strategies (**Fig. 1 right**).

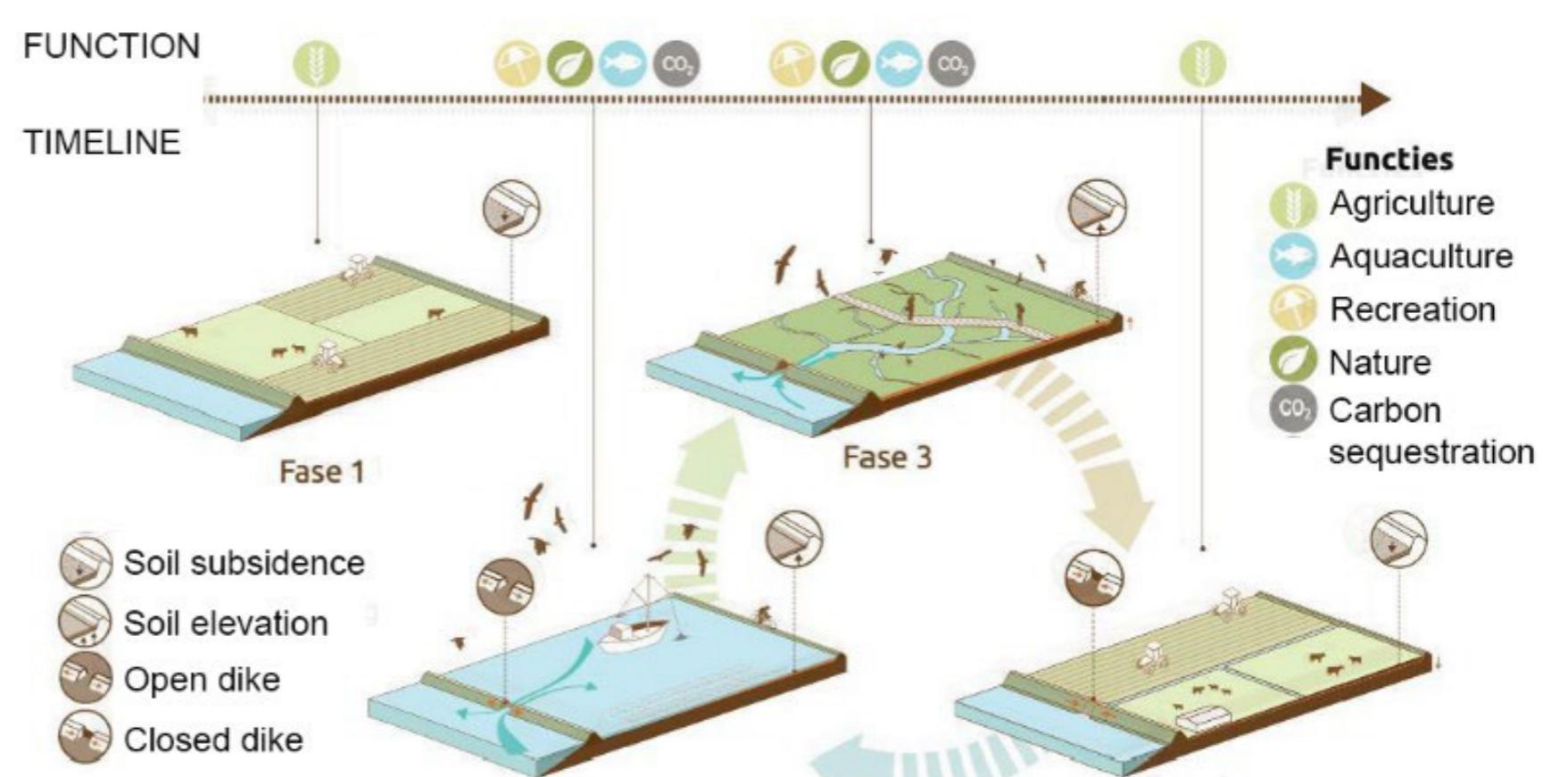


Figure 1. Combining dikes with wetlands (van Belzen et al. 2021)

## following a collaborative design to define game requirements



Currently at step 1 of the **Fig. 2**, we involve various stakeholders from public, private and civic organisations representing the nested processes behind the prototype as informants or co-designers based on mutual benefit from their involvement.

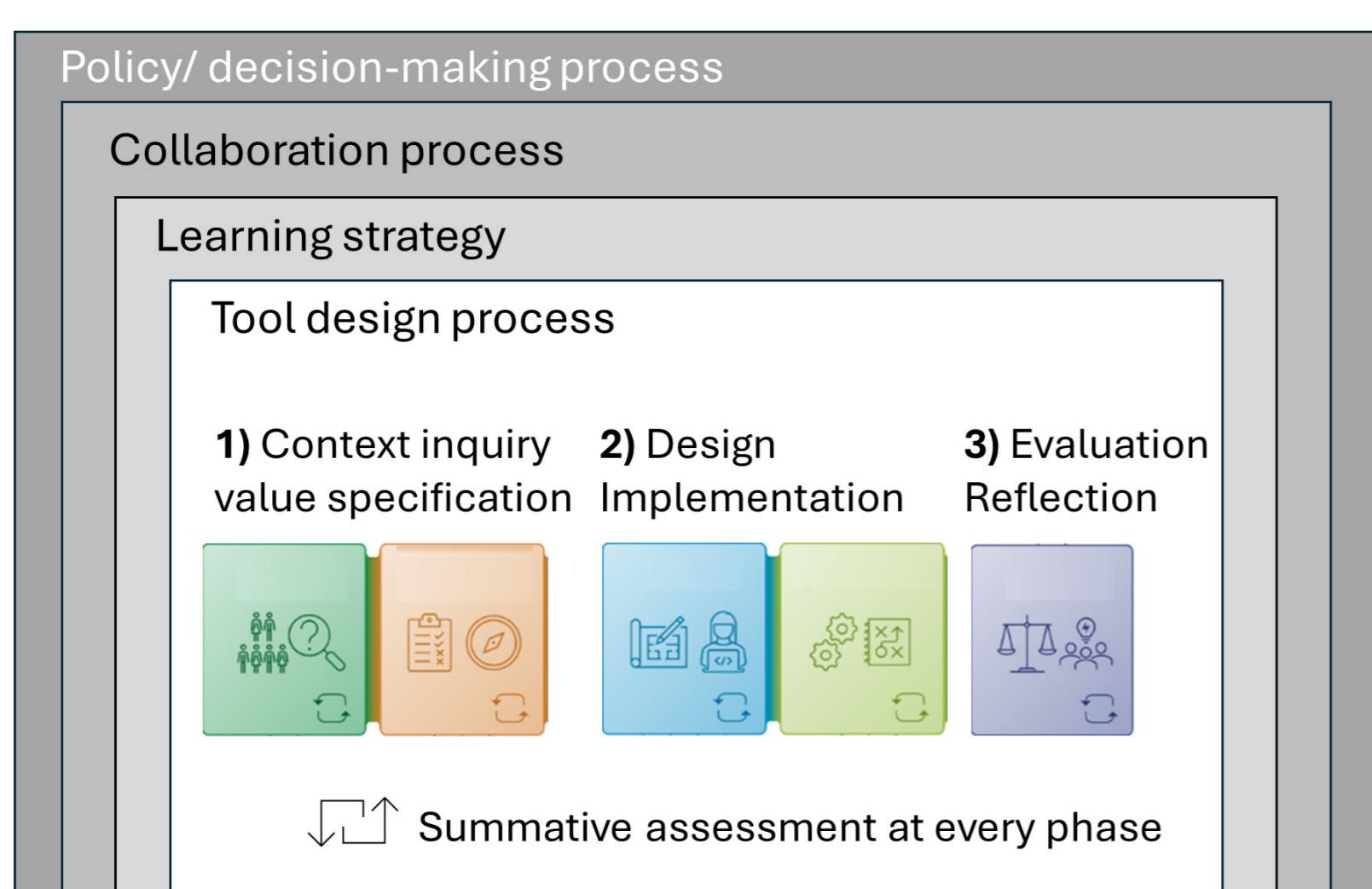


Figure 2. Collaborative design framework (Adapted from Kip et al., 2025)

**Policy-making context:** Delta communities and managers prioritized land reclamation over long-term flood safety and nature.

**Decision and collaboration value:** Combining dikes with wetlands needs space, long-term vision, and community support.

### Learning strategy

1. Role of water-sediment dynamics in the delta's resilience and long-term sustainability,
2. Benefits and challenges of combining protection,
3. Collective reflection and responsibility on past management to enable flexible and adaptive futures.

## and explore prototypes addressing all generations

<b>Audience</b>	School students	Their families	(Future) managers and experts.
<b>Learning Goal</b>	Water and sediment dynamics	Manage expectations and emotions	Envision and discuss adaptation pathways
<b>Setting</b>	Classroom	Exhibition or field visit	Ice-breaking of meetings with elements customised to the areas explored through the $\Delta$ ENIGMA ( <b>Fig. 4</b> )

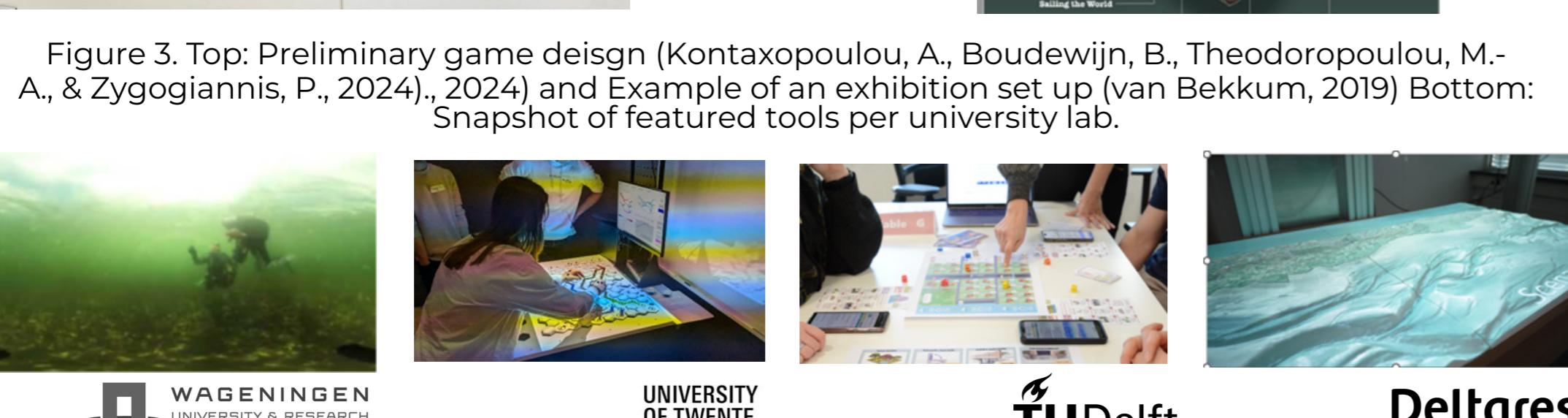


Figure 3. Top: Preliminary game design (Kontaxopoulou, A., Boudewijn, B., Theodoropoulou, M.-A., & Zygogiannis, P., 2024), Example of an exhibition set up (van Bekkum, 2019) Bottom: Snapshot of featured tools per university lab.



Figure 4.  $\Delta$ ENIGMA areas where sustained high resolution observations are collected in rivers (1) estuaries; (2) rivers (and (3) beaches and dunes