Intreerede prof.dr. J.H. Slinger

'Polyphony in water and coastal policy'

Hoogleraar Transdisciplinary Policy Development
Faculteit TBM

Woensdag 28 mei 2025

TU Delft

Polyphony in Water and Coastal Policy

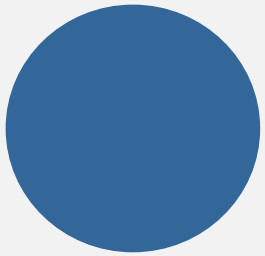
Jill Slinger

28 May 2025

TU Delft

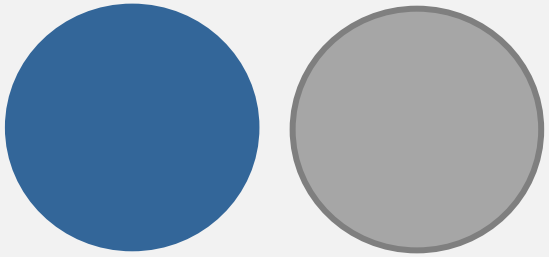
Transdisciplinarity

Disciplinary



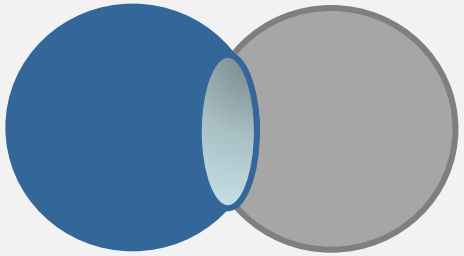
- single discipline
- own standards and methods

Multidisciplinary



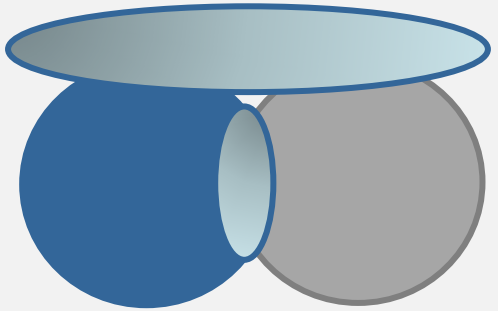
- collaboration between disciplines
- own standards and methods

Interdisciplinary



- combined approach
- shared (new) standards and methods

Transdisciplinary



- Combined meta-level approach
- shared (new) standards and methods
- with society

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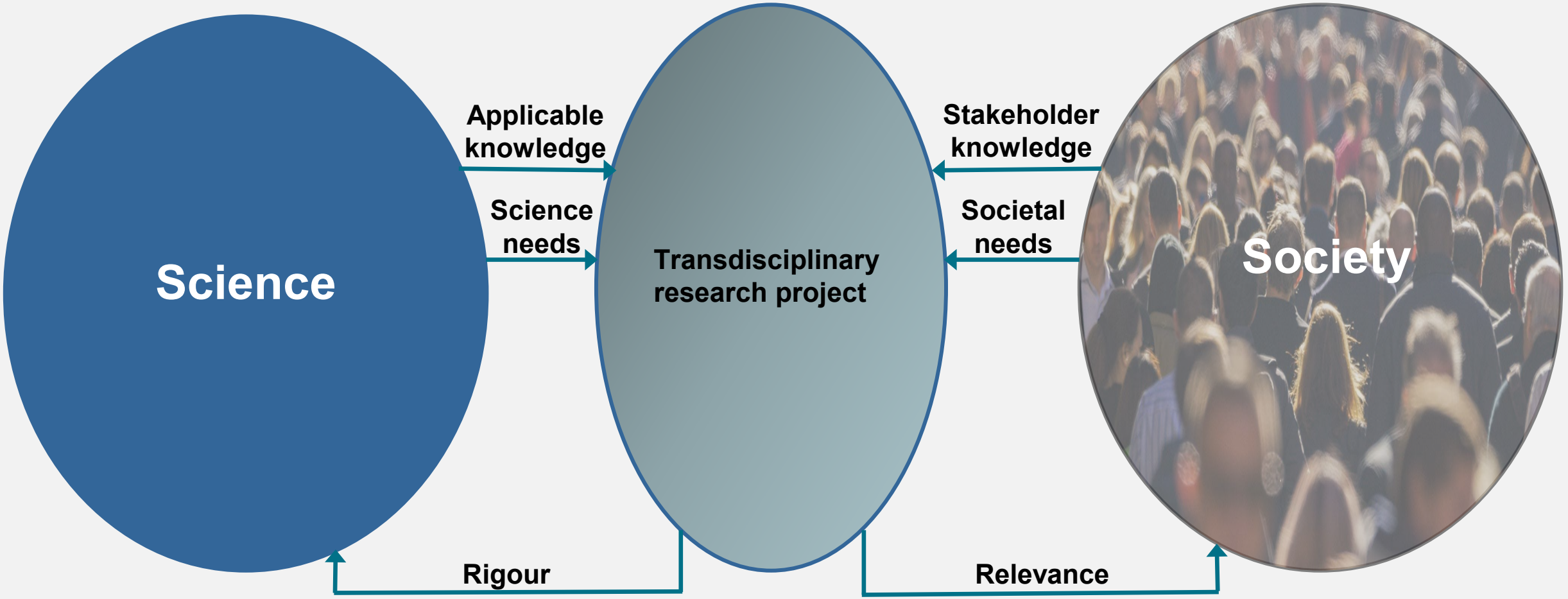
Image: askanacademic.com

Transdisciplinarity



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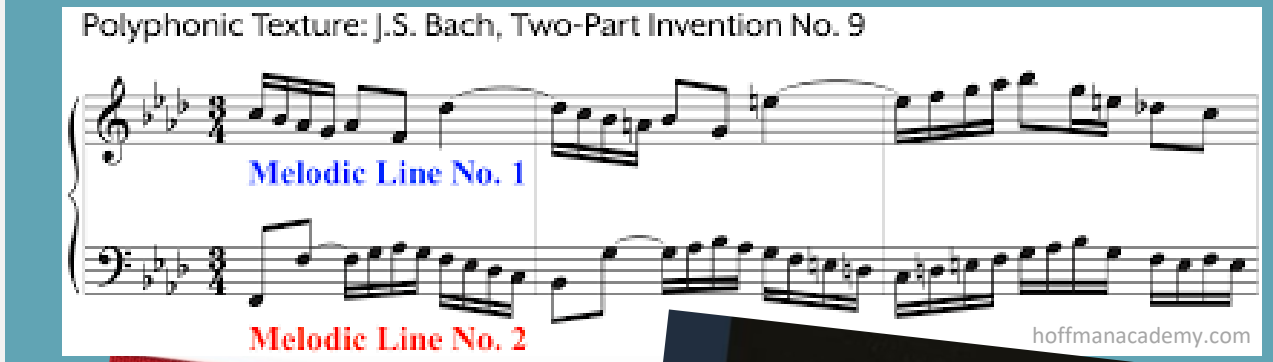
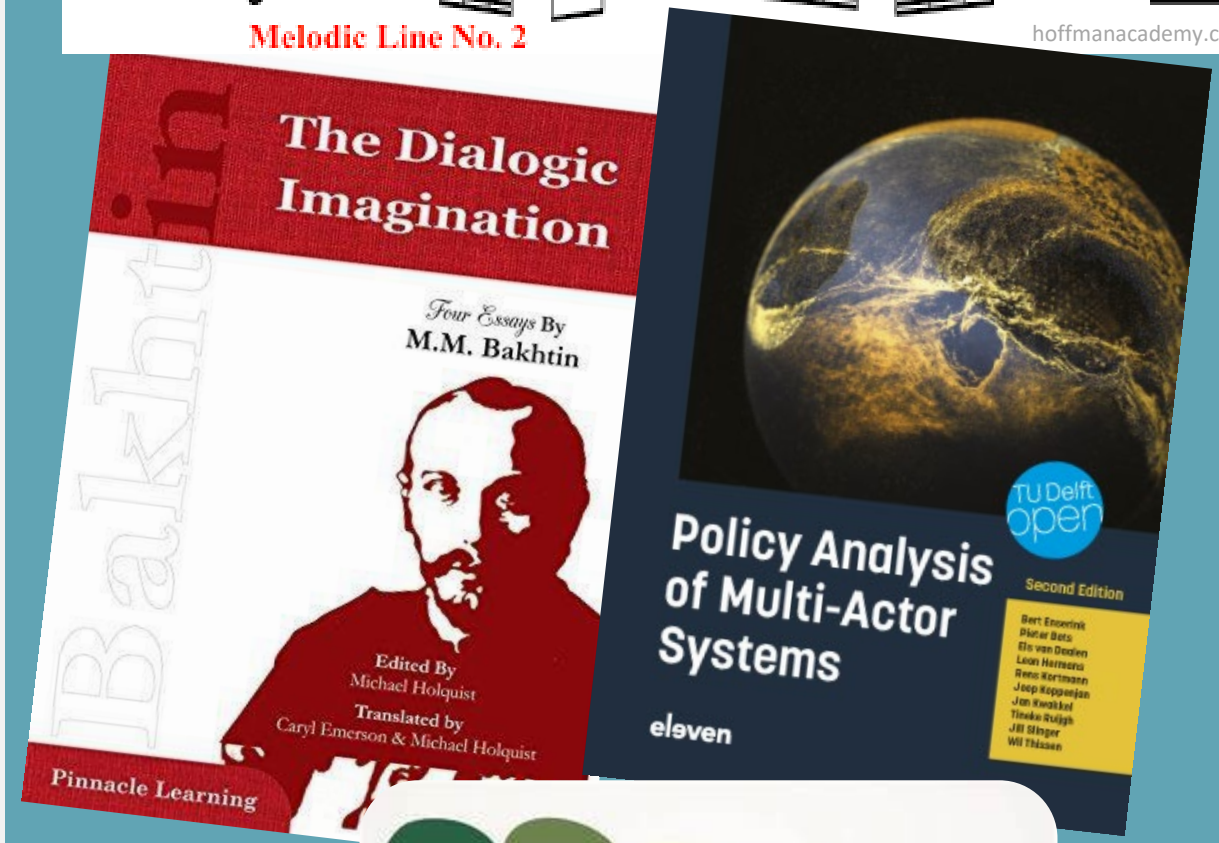
Adapted from: Bergmann, M., & Jahn, T. (2008) & Hevner (2007)

Image: askanacademic.com

Polyphony in policy

- **Polyphony literally means multiple voices**
- **In music** - the co-existence of 2 or more simultaneous, independent melodies (or voices) in a composition
- **In policy** – multiple stakeholders with independent perspectives and diverse interests; a dialogic or multi-actor stance towards decision making





Our Challenging Future

Societal **T**echnological **E**conomical **E**nvironmental **E**nergy **P**olitical Changes

Urbanisation (mega-cities)

Globalisation (free market)

Environmental uncertainty & extremes (climate change, biodiversity loss)

Innovation (internet of things)

Individualisation & increasing inequity

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Our Challenging Future

Societal **T**echnological **E**conomical **E**nvironmental **E**nergy **P**olitical Changes

Individualisation & increasing inequity

Innovation (internet of things)

Environmental uncertainty & extremes (climate change, biodiversity loss)

Globalisation (free market)

Urbanisation (mega-cities)

Need: Innovative, nature-based, stakeholder-inclusive, value-based and locally relevant, transformative solutions

Transdisciplinary science

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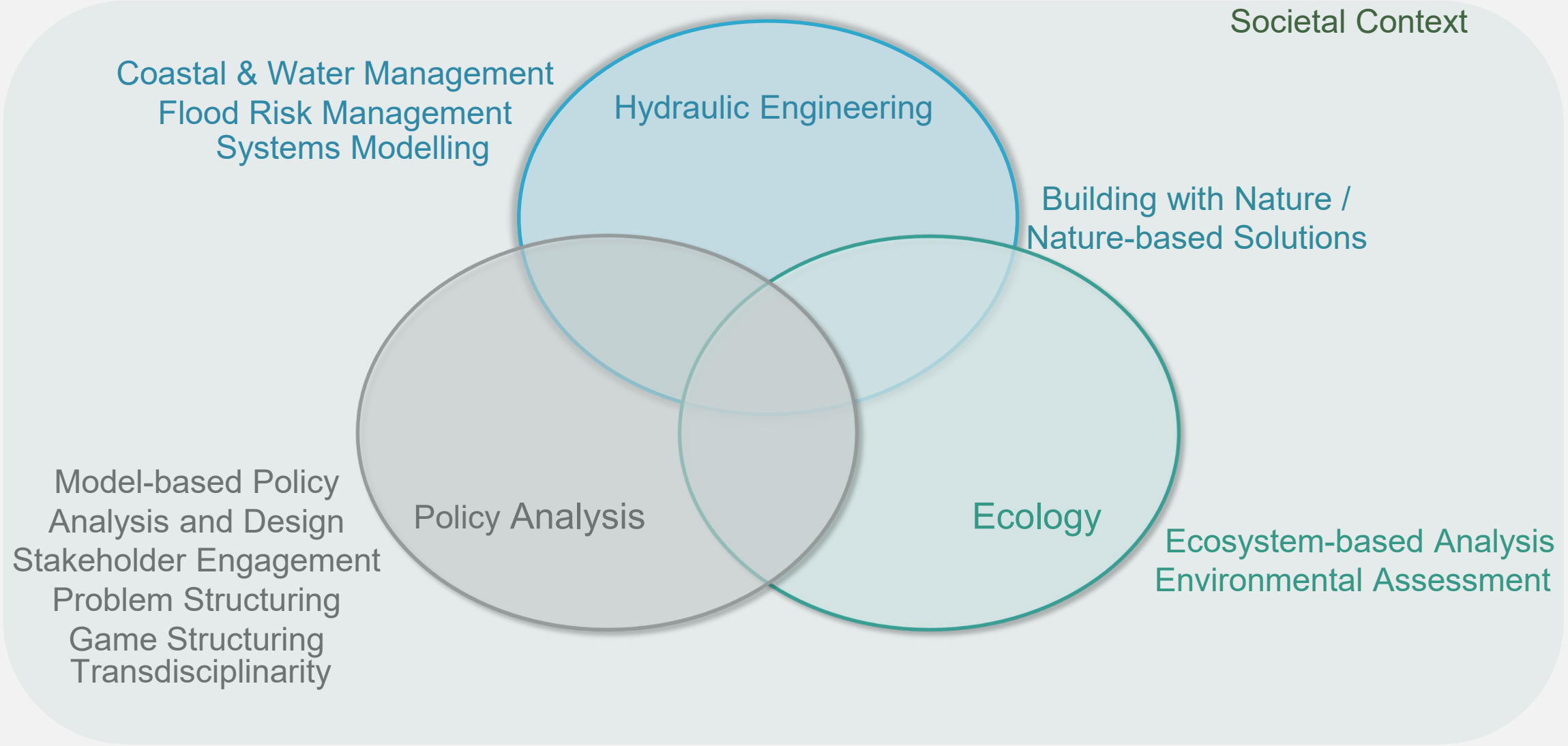
My Personal Journey



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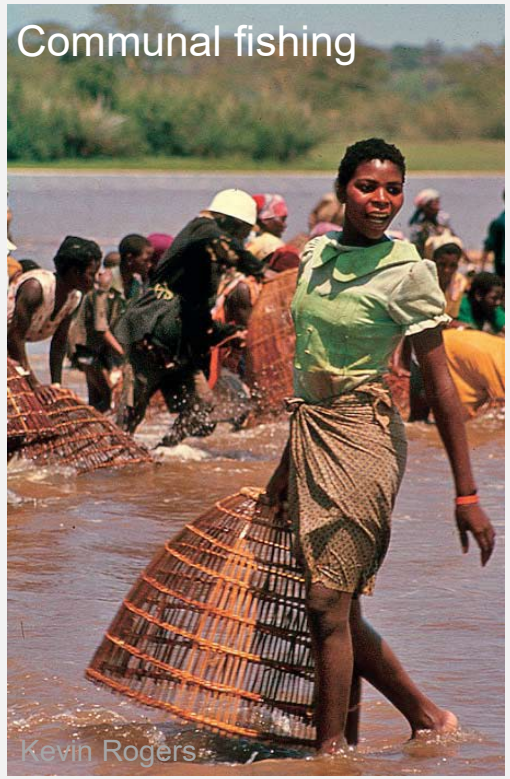
My Personal Journey

- Pongola Floodplain*

- Interdisciplinary space
- Ecosystem-based approach
- Boundary spanning modelling
- Advice to decision makers
- Societal context



*Clifford Holmes, J. K., Slinger, J. H., Palmer, C. G. (2017). Using System Dynamics modelling in South African water management and planning. In: A Brent and T Simelane (eds.). System Dynamics Models for Africa's Developmental Planning. Africa Institute of South Africa, Pretoria, SA.

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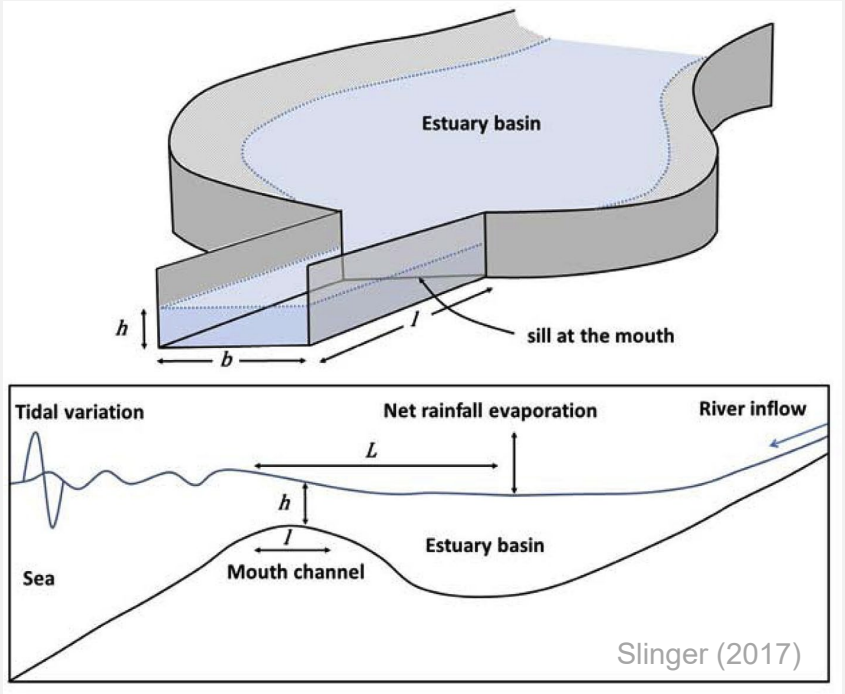
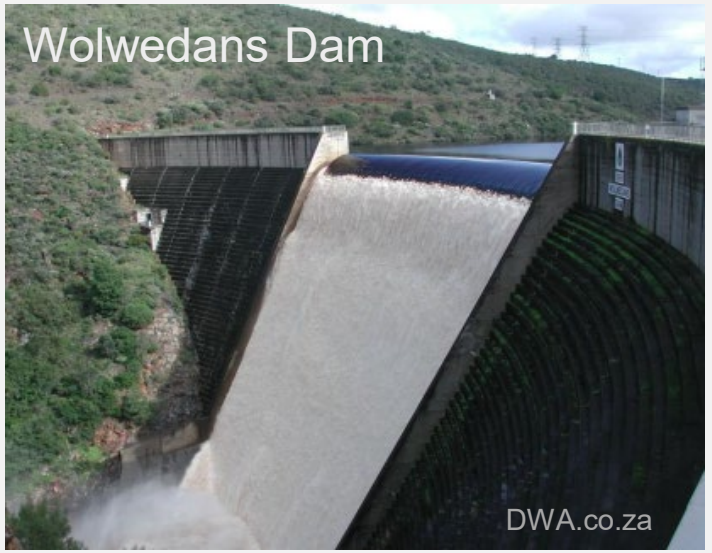
My Personal Journey

- Pongola Floodplain
- SA Estuaries*
- SA Water Law (SA-WL)





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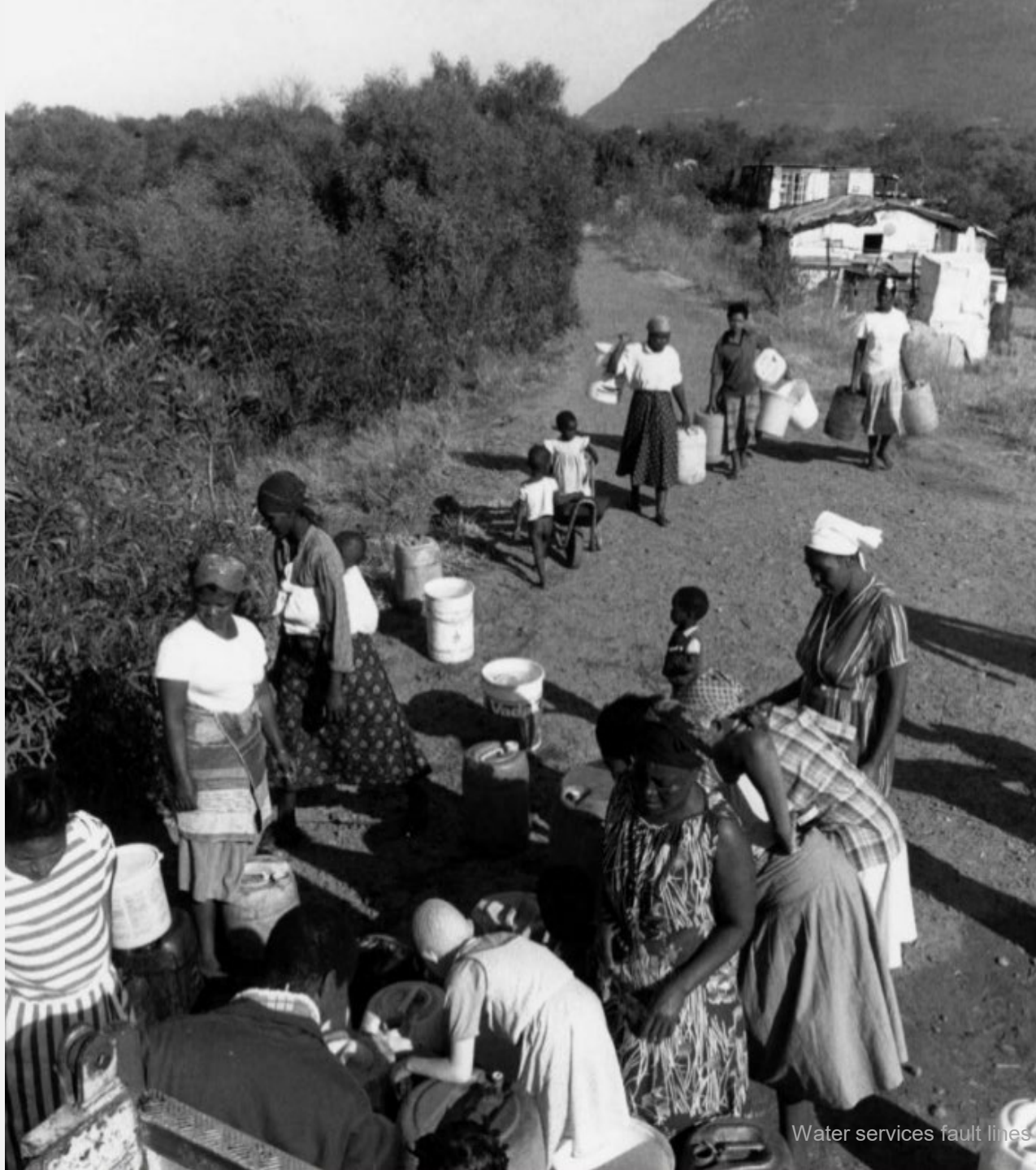
* Slinger, J.H. (2017). Hydro-morphological modelling of small, wave-dominated estuaries. Estuar. Coast. Shelf Sci. 198: 583-596
Slinger J.H., Taljaard, S. & Largier, J.L. (2017). Modes of water renewal and flushing in a small intermittently closed estuary. Est. Coast. Shelf Sci. 196: 346-359.
Slinger, J.H. (2024). Water renewal and stratification modelling in small estuaries. Estuar. Coast. Shelf Sci. 300, May 2024, 108720.
Taljaard, S., van Niekerk, L., Slinger, J.H. (2017). A screening model for assessing water quality in small, dynamic estuaries. Ocean Coast. Manag. 146: 1-14.

My Personal Journey

- Pongola Floodplain
- SA Estuaries*
- SA Water Law (SA-WL)

- Engaging with communities & coastal managers
- Boundary spanning modelling
- Ecosystem-based approach
- Communicating about models
- Science – policy divide



My Personal Journey

- Pongola Floodplain
- SA Estuaries
- SA Water Law (SA-WL)
- Long Term Vision (LTV) – Scheldt*

- Complex biophysical system
- Boundary spanning modelling
- Contested environment
- Science – policy divide
- Unheard voices?

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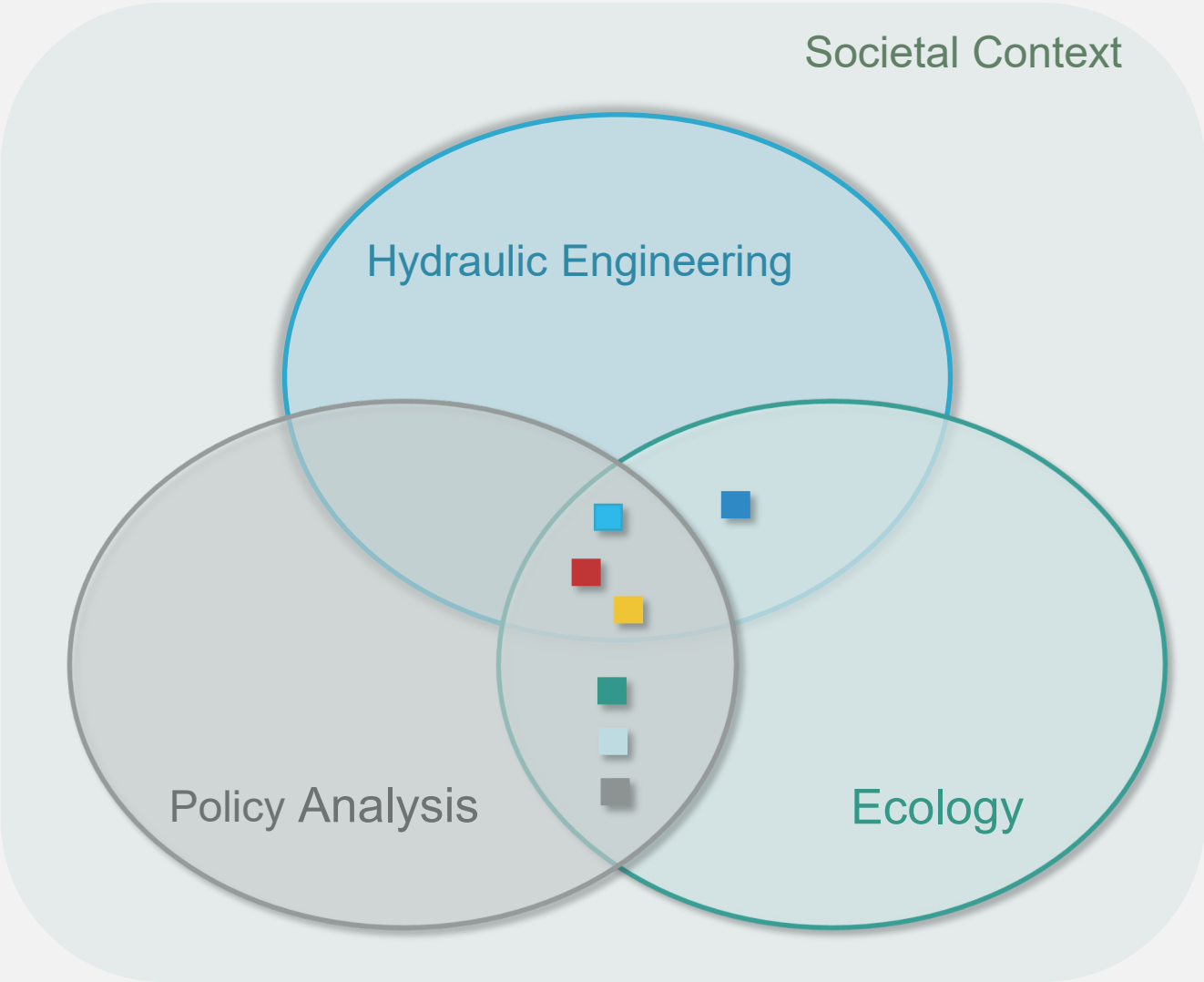
*Slinger, J.H., Muller, M., Hendriks, M. (2007). Exploring local knowledge of the flooding risk of the Scheldt Estuary. Water science and technology, 56(4), 79-86.
Slinger, J.H. (2023). Developing the transboundary Long Term Vision of the Scheldt Estuary – an untold story. Water International 48(8): 1046-1067.

My personal journey

- Pongola Floodplain
- SA Estuaries
- SA Water Law (SA-WL)
- Long Term Vision (LTV) – Scheldt

- Building with Nature (BwN)
- Co-Design in Great Brak, Texas, Ghana, Texel
- Sustainable Ports in Africa, Ghana



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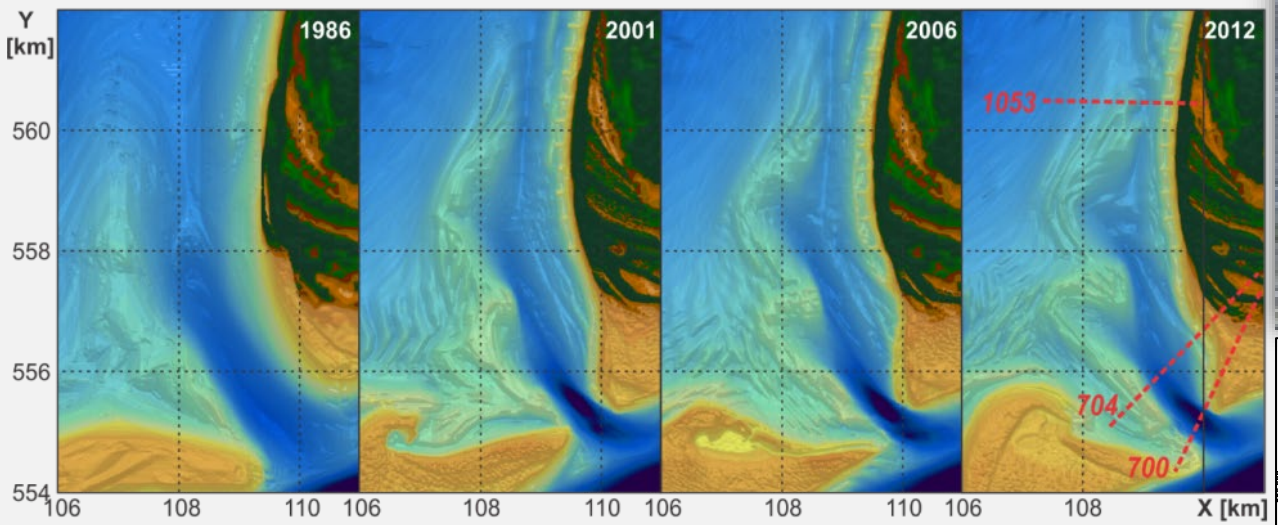
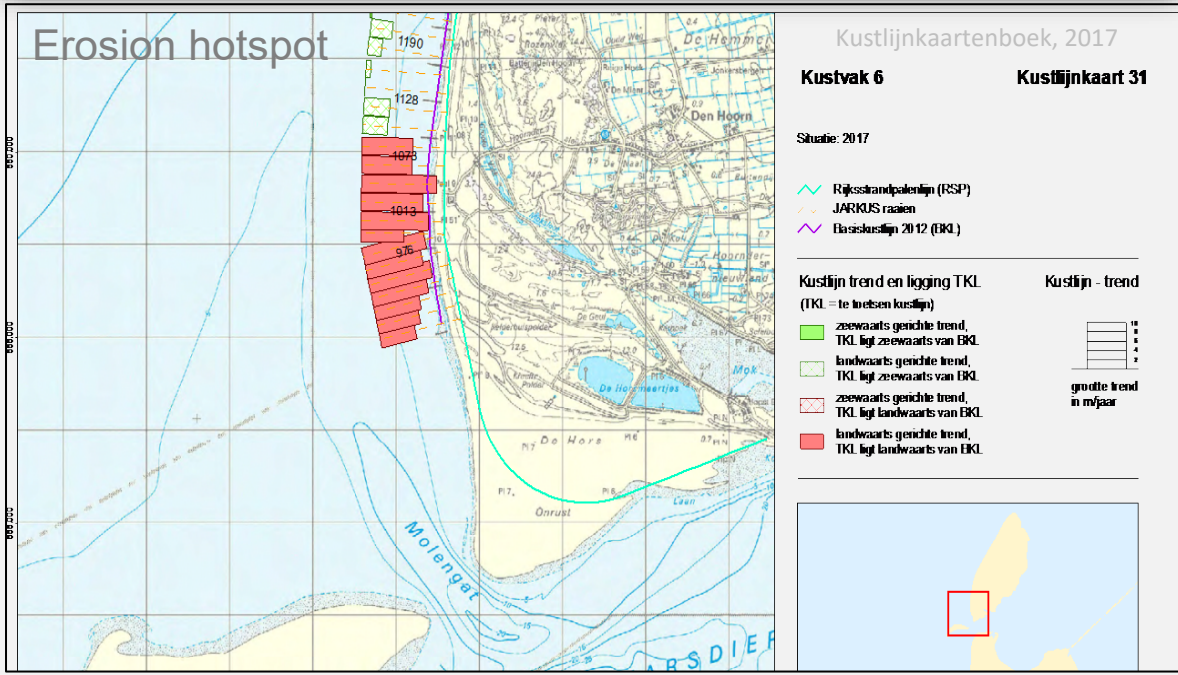
Transdisciplinary co-design – Texel, NL



Evolution of Texel inlet 1986 – 2012*



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*Elias E.P.L, van der Spek A.J.F. (2017). Dynamic preservation of Texel Inlet, the Netherlands: understanding the interaction of an ebb-tidal delta with its adjacent coast. Netherlands Journal of Geosciences 96(4):293-317.

Wijnberg, K., Mulder, J., Slinger, J., van der Wegen, M., and van der Spek, A. (2015). Challenges in developing 'Building with Nature' solutions near tidal inlets. Presented at the Coastal Sediments '15 conference, Understanding and Working with Nature, May 11 – 15, 2015, San Diego, CA, USA.

Co-designing **Co**astal **Channel** Shoal Systems (**CoCoChannel**)

CoCoChannel Co-Design Workshop*

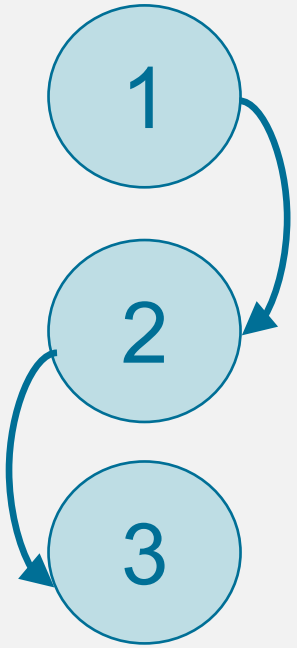
1. Get acquainted
2. Determine the key stakeholders
3. Build a shared system understanding
4. Visioning (utopian & dystopian)
5. Rate and determine underlying values

* Expert inputs

* Validate expert inputs

6. Facilitate discussion on commitment to action

PhD work
F d'Hont



SW Texel co-design workshop:
Local stakeholders; Texel mayor; policy analysts, HHNK waterboard; coastal modellers, morphologists & managers

Expert workshop
Coastal managers, morphologists, engineers, ecologists, policy scientists, planners, institutional designers

Validation workshop
Local stakeholders

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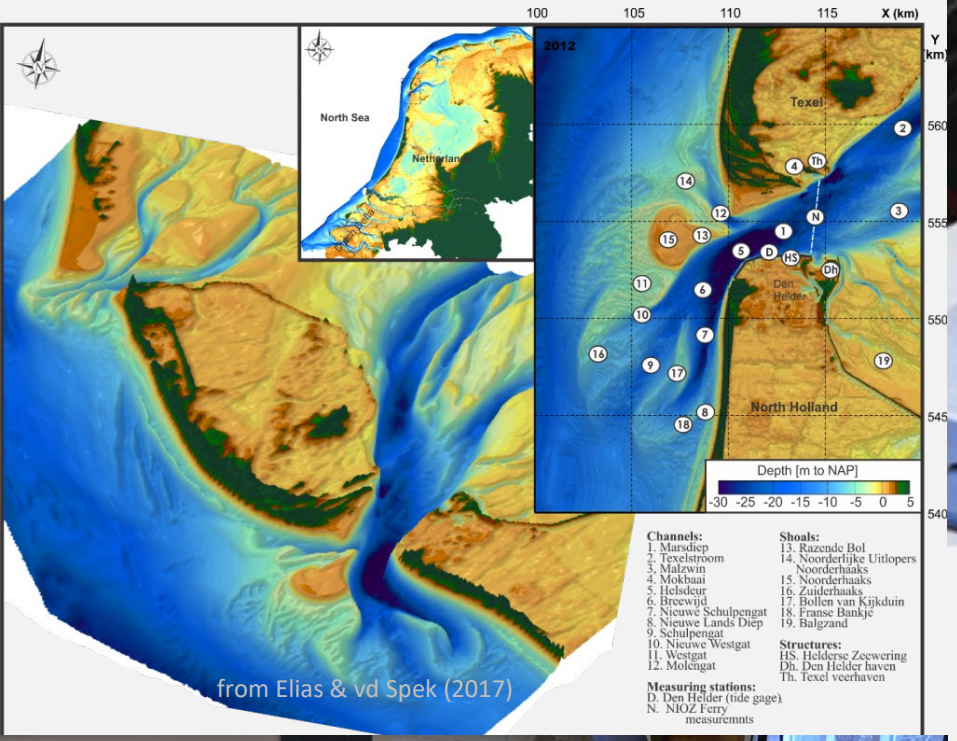
*D'Hont, F.M., Slinger, J.H. (2022). Including local knowledge in coastal policy innovation: comparing three Dutch case studies. Local Environment. Int. J. Justice & Sustain. 27(7): 897–914.
d'Hont, F.M. (2022). Co-design in the coastal context. PhD Dissertation, Delft University of Technology, Delft, Netherlands.
Slinger, J.H., Kothuis, B. (2022). A specific transdisciplinary co-design workshop-model to teach a multi-perspective problem approach for integrated nature-based design. In: (eds. S. Brody, Y. Lee, B. Kothuis) Coastal Flood Risk Reduction: Comparisons from the Netherlands and the U.S. Upper Texas Coast. Elsevier, Amsterdam, Netherlands. ISBN: 97803-2385-2524

What does co-design look like?



from Elias & vd Spek (2017)


F d'Hont


F d'Hont


F d'Hont


JSlinger

Some Effects

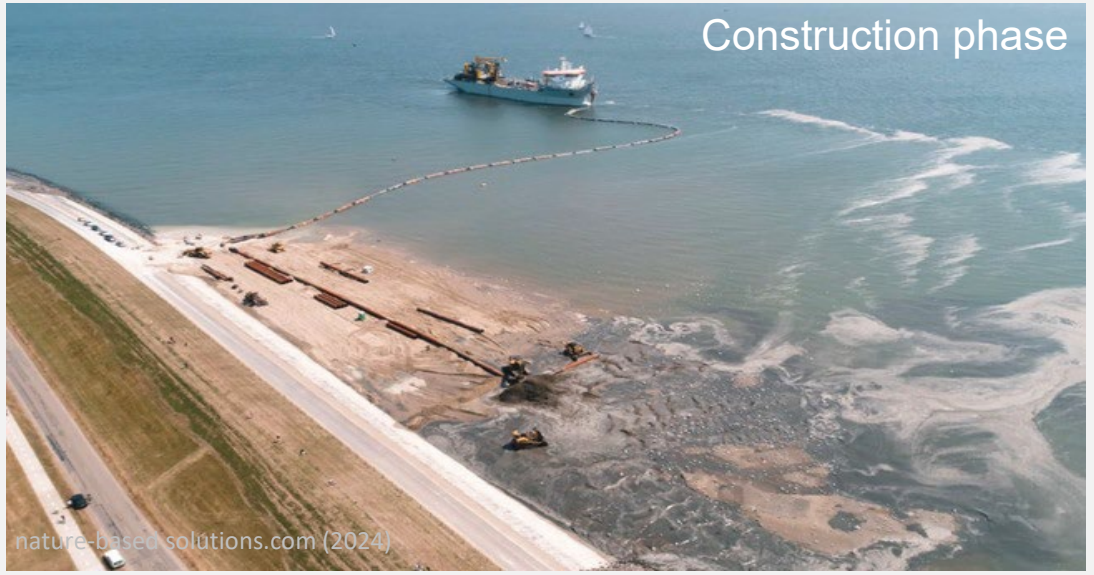
Local societal impacts

- Space for **listening to and learning from** and about each other
- Model- & nature-based understanding of long-term dynamics of SE Texel
- An erosion problem or an institutional issue?
- Locally relevant, negotiated pathways to preferred futures
- Knock on effects…..

Prins Hendrik Zanddijk

"The idea of using a sand nourishment approach came from the local municipality and inhabitants of Texel."

(nature-based solutions.com, 2024)



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Some Effects

Research outcomes

- Articles, PhD, book & rigorous reflective learning

LOCAL ENVIRONMENT
2022, VOL. 27, NO. 7, 897–914
https://doi.org/10.1080/13549839.2022.2084722

RESEARCH ARTICLE

Routledge
Taylor & Francis Group

OPEN ACCESS Check for updates

Including local knowledge in coastal policy innovation: comparing three Dutch case studies

Floortje M. d'Hont[a] and Jill H. Slinger[a,b]

Natural Hazards (2023) 119:1171–1191
https://doi.org/10.1007/s11069-023-06139-y

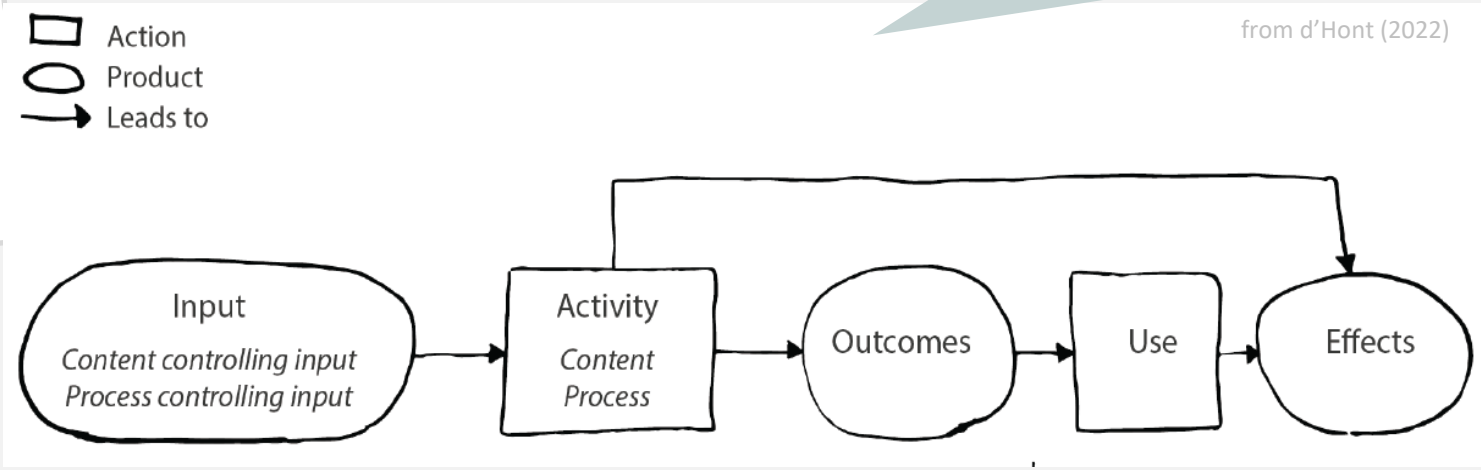
ORIGINAL PAPER

A co-design method for including stakeholder perspectives in nature-based flood risk management

Jill H. Slinger[1,2] · Scott C. Cunningham[3] · Baukje L. M. Kothuis[4]

- Ecosystem-based approach
- Offered model-based insights
- 'Silent majority' stakeholders / unheard voices
- Configured safe listening and learning space
- Local people acquired and used knowledge on long term dynamics

- Rigorous evaluation of the intervention



Framework for evaluating co-design (d'Hont 2022, after Thissen & Twaalhoven 2001)

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Transdisciplinary co-design - Ghana

Local societal impacts

- Model- & nature-based understanding of long term dynamics expressed in **own system story**
- Locally relevant, negotiated pathways to a range of futures, deepened understanding of trade-offs

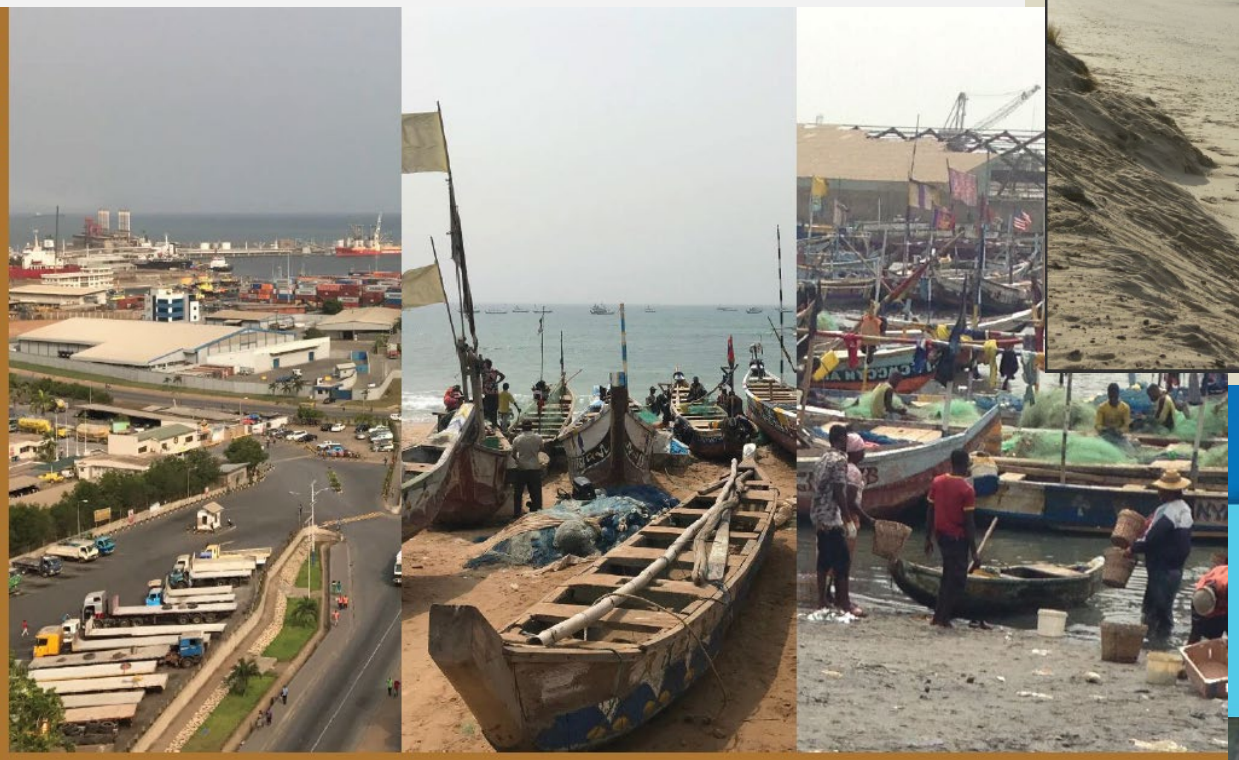
Research impacts

- Publications; PIANC conferences; Pan-African seaports database; co-design methodology
- MScs (Dutch & Ghanaian); initiation of Ghanaian Phds

Network impacts

- Port developers in West Africa & Southeast Africa

Multiple Voices…



Teaching and Research: Two sides of the same coin

- Initiated BwN / NbS teaching within TU Delft
- 2 Massive Open Online Courses (MOOCs)
- **> 25 000 students from 169 countries** since 2017
- On-campus teaching in Brazil, Vietnam and Indonesia
- Course in TPM's Water and Delta Systems specialisation
- **NBS4AfRes** – 4 universities in Senegal and South Africa (2024 – 2026)

Building with Nature is an approach to designing hydraulic infrastructure that strives for "a flexible integration of land in water and water in land using interactions and materials present in nature" (Waterman 2010)

Equipping a new generation of engineers to employ ecosystem-based and stakeholder-inclusive design principles and to undertake transdisciplinary engagement

Wadden Coast / Ecomare

Building with Nature & Beyond..

https://textbooks.open.tudelft.nl/textbooks/catalog/book/45

From MOOC's to e-Book

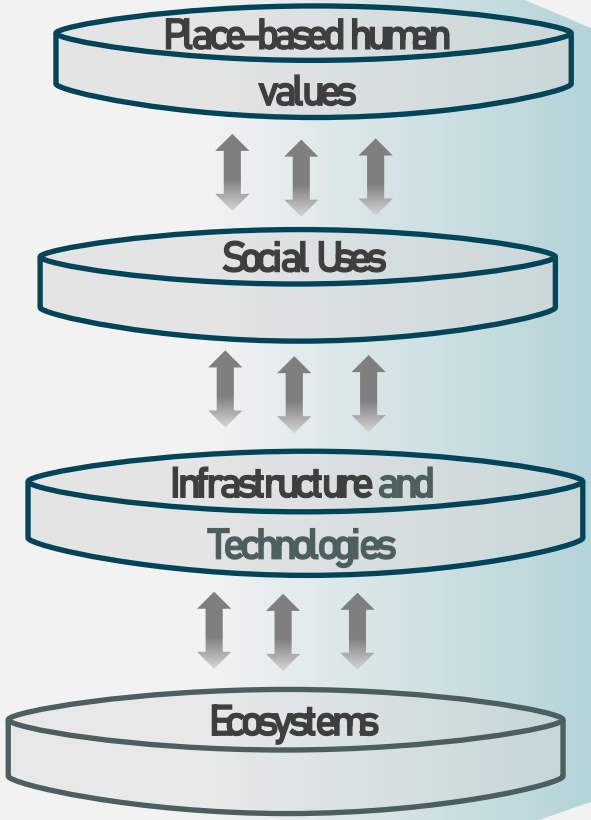
Inter- and transdisciplinary design space — Part I = MOOC 1

Designing transdisciplinary engagement and coalition building within a multi-layered governance system — Part II = MOOC 2

Slinger, J.H. (2022). Building with Nature & Beyond. Principles for designing nature based engineering solutions. TU Delft Open Publishing, Delft, Netherlands. ISBN 978-94-6366-457-8. 428pp.

Transdisciplinary Co-Design

Meta-design, crafting and evaluating complexity-informed, ecosystem-based, stakeholder-inclusive and value-sensitive interventions at the interface between science and policy



Co-design methods & models for transdisciplinary policy development

- Effective policies in water and coastal environments
- (Action towards) Locally relevant ecosystem-based outcomes
- Learning on co-design methods & transdisciplinary engagement

Research Vision

To deepen and formalise knowledge on transdisciplinary engagement in co-designing policy in coastal and water environments

Three lines of enquiry

1. Theoretical promise vs empirical reality
2. Methods & tools that configure multiple voices
3. Conceptualising co-design

4 examples

Transformative Agenda in Transdisciplinary Policy Development

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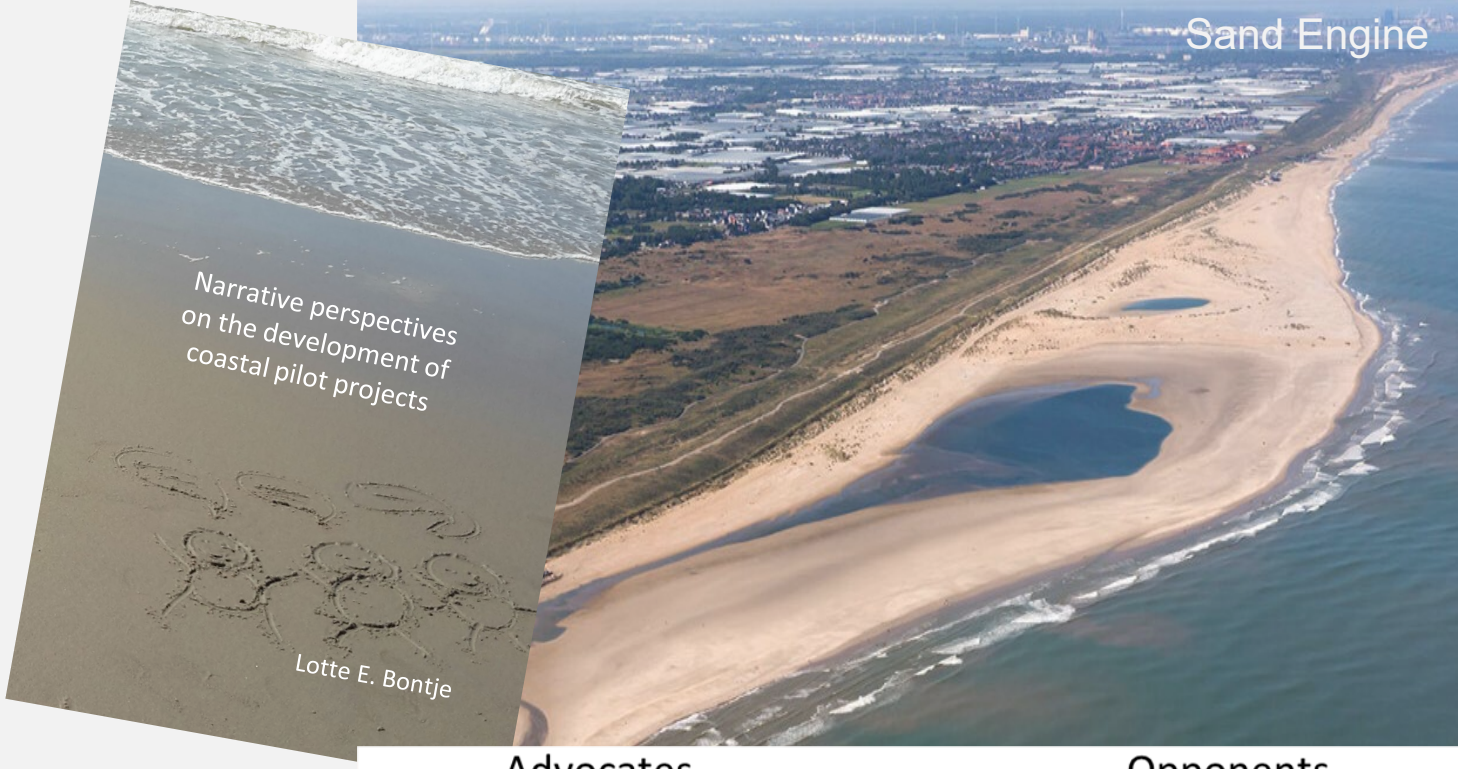
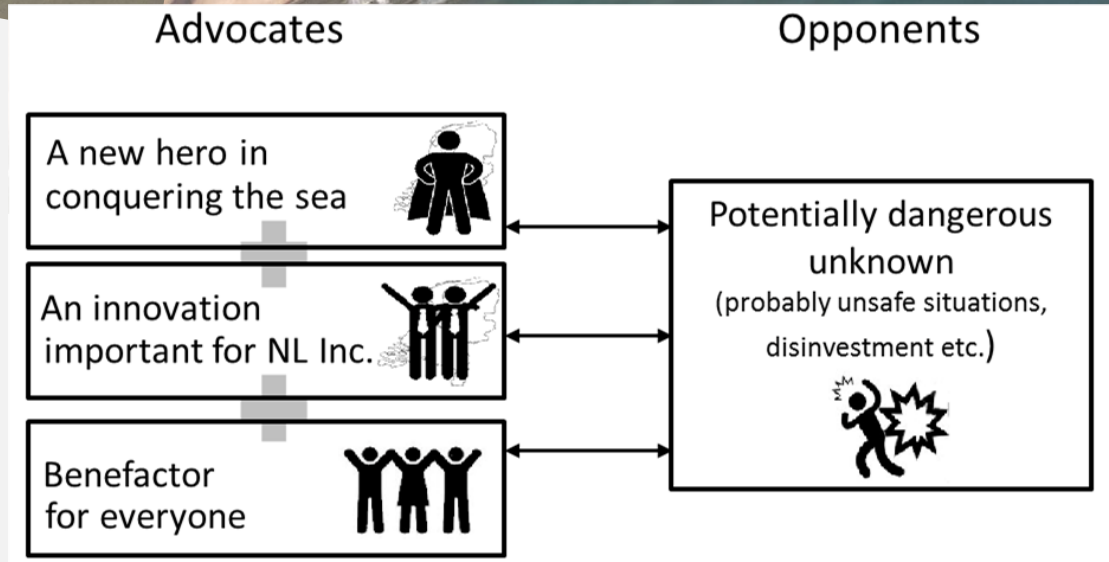
Narratives in Polyphonic Policy Development



- Narrative competition model of policy development
- Dominant narratives?
- Configuring spaces (beyond project level) where voices of people and nature can be heard



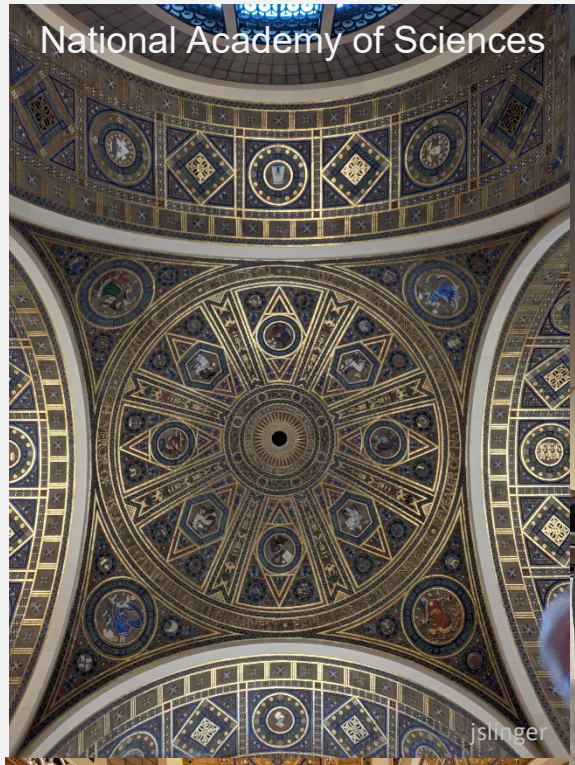
PhD work
L Bontje*

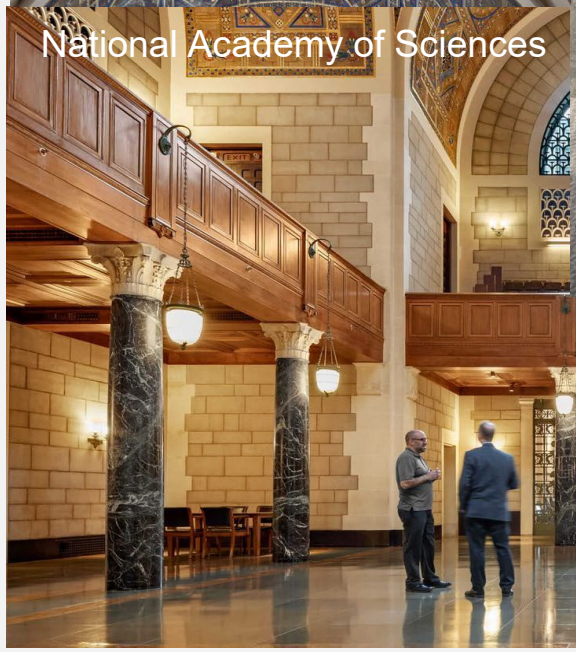
TU Delft

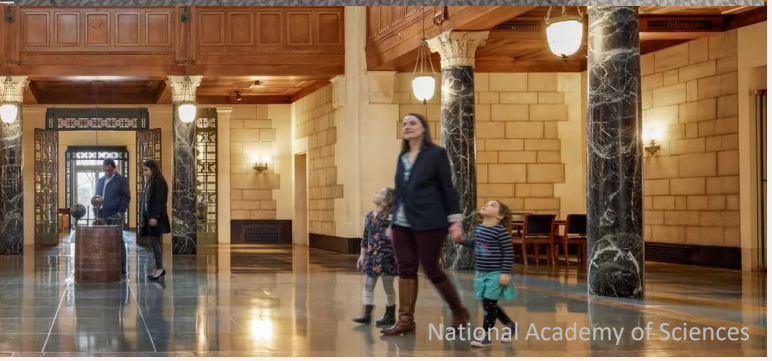
*Bontje, L.E. (2018). Narrative perspectives on the development of coastal pilot projects. PhD dissertation, TU Delft, Delft, NL.
Bontje, L..E., Slinger, J.H. (2017). A narrative method for learning from innovative coastal projects - biographies of the Sand Engine. Ocean and Coastal Management 142: 186-197.
Bontje, L.E., Slinger, J.H. (2019). On narrative competition in coastal policy development, presented at Scientific Polyphony: How science narratives configure many 'voices', Narrative Science project of the European Research Council in 2019, coordinated by the London school of Economics and Political Science.

Upscaling NbS

- 1st National Policy Forum on Nature-based Solutions, National Academy of Sciences, Washington D.C.
- Standards for NbS design
- Governance arrangements
- Financial gaps







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Slinger, J.H. (2024). NbS in the Netherlands: from pilot to policy and practice. Presented at 1st National Policy Forum on Nature-based Solutions, 8 February 2024, National Academy of Sciences, Washington D.C., USA.

NbS Financing gap

- Systems perspective
- Intrinsic characteristics, uncertainties of NbS
- Associated with barriers related to NbS cost structure, NbS funding gaps and NbS financing
- via 6 mechanisms operating within our institutional settings

PhD work
L Hüsken

TU Delft

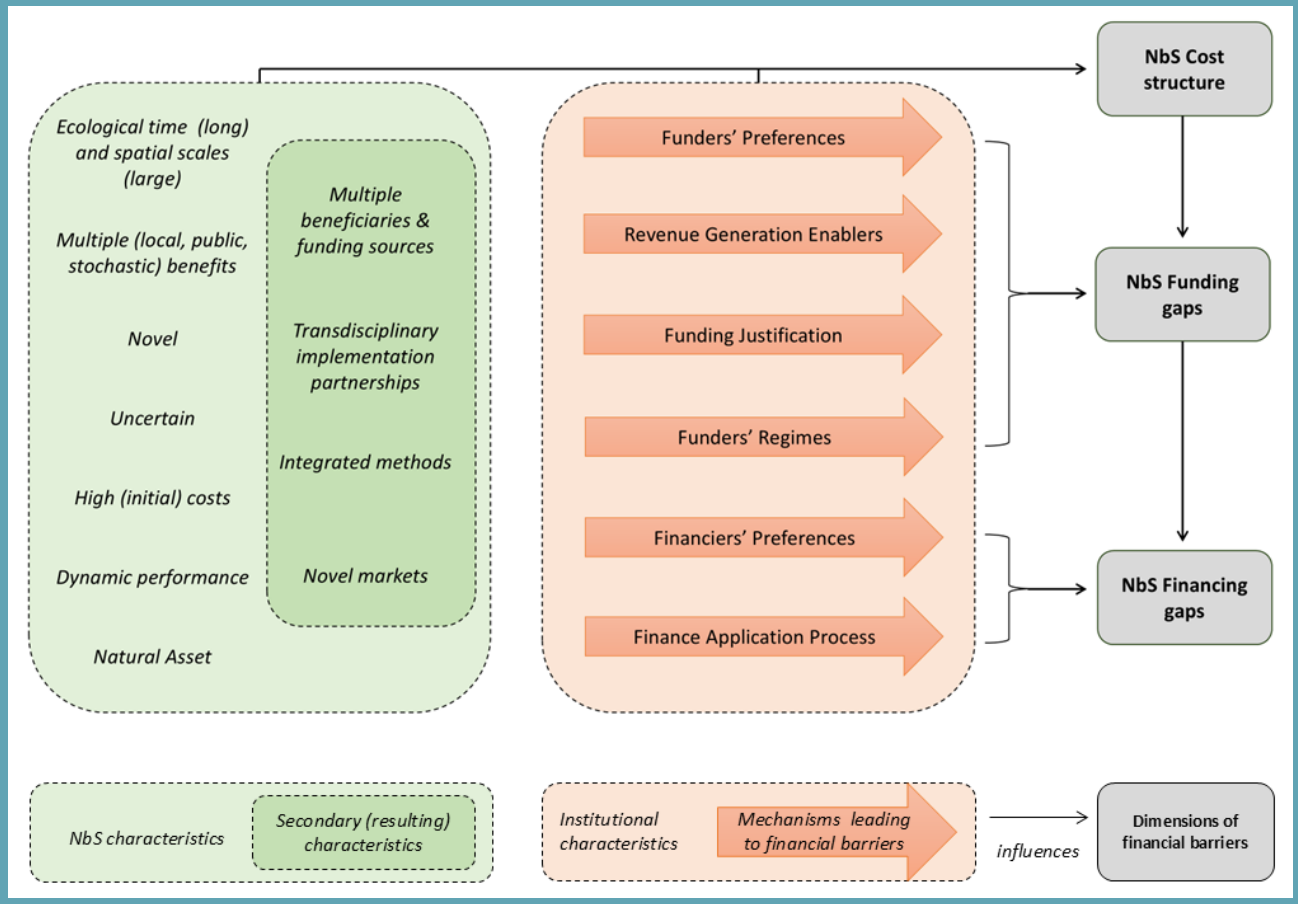
Contents lists available at ScienceDirect

Nature-Based Solutions

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

Money talks. A systems perspective on funding and financing barriers to nature-based solutions

Lieke M. Hüsken [a,b,*], Jill H. Slinger [a,c], Heleen S.I. Vreugdenhil [a,b], Mónica A. Altamirano [a,d]



Role of conceptual models

- Science – policy divide
- Conceptual models as linking pin
- Evidence from Coastal Genesis 2

- How generalisable are the insights?

PhD work
Q Lodder

Ocean and Coastal Management 237 (2023) 106499

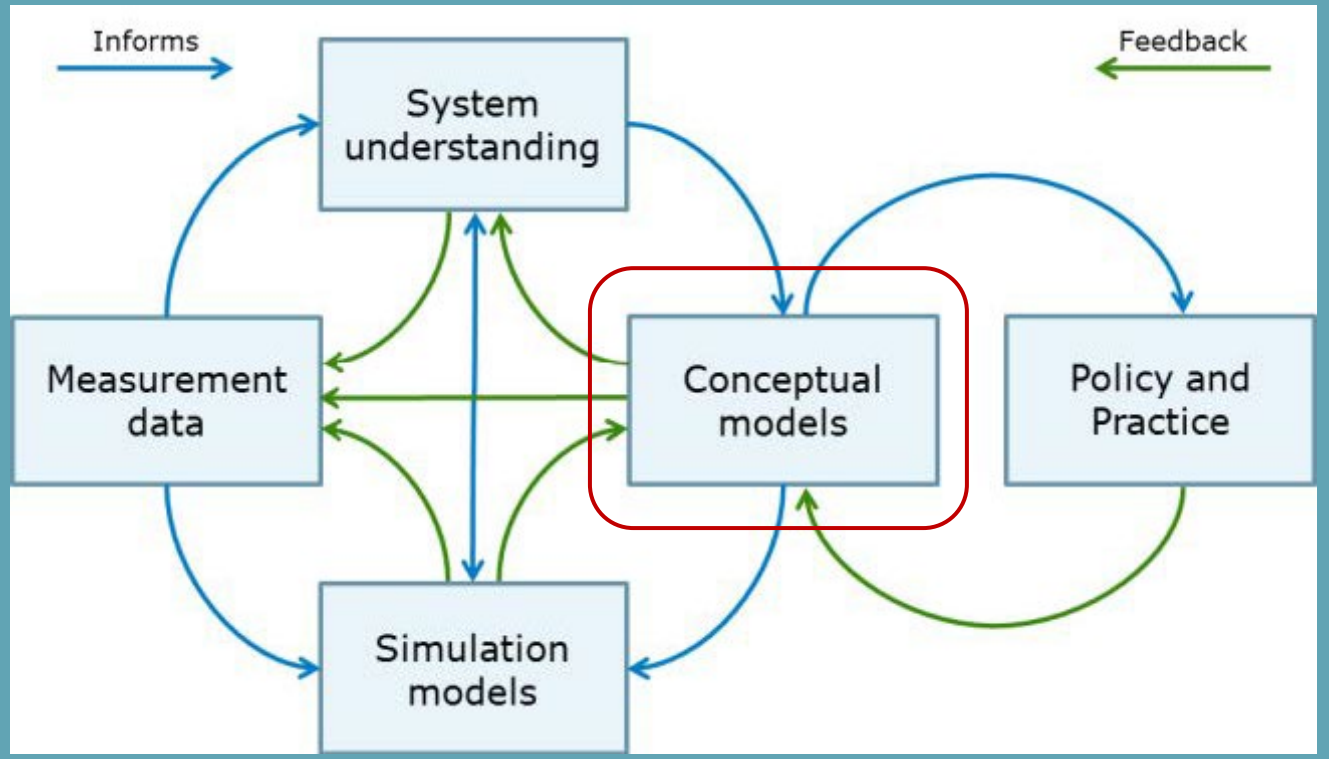
Contents lists available at ScienceDirect

Ocean and Coastal Management

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

The Coastal Genesis 2 research programme: Outputs, Outcomes and Impact

Q.J. Lodder [a,b,*], J.H. Slinger [a,c], Z.B. Wang [a,d], A.J.F. van der Spek [d], M.P. Hijma [d], M. Taal [d], C. van Gelder-Maas [b], H. de Looff [b], J. Litjens [b], C.A. Schipper [b], M. Löffler [e], A.J. Nolte [d], C. van Oeveren [d], J.J. van der Werf [d,f], B.T. Grasmeijer [d], E.P.L. Elias [d], H. Holzhauer [b], P.K. Tonnon [d]

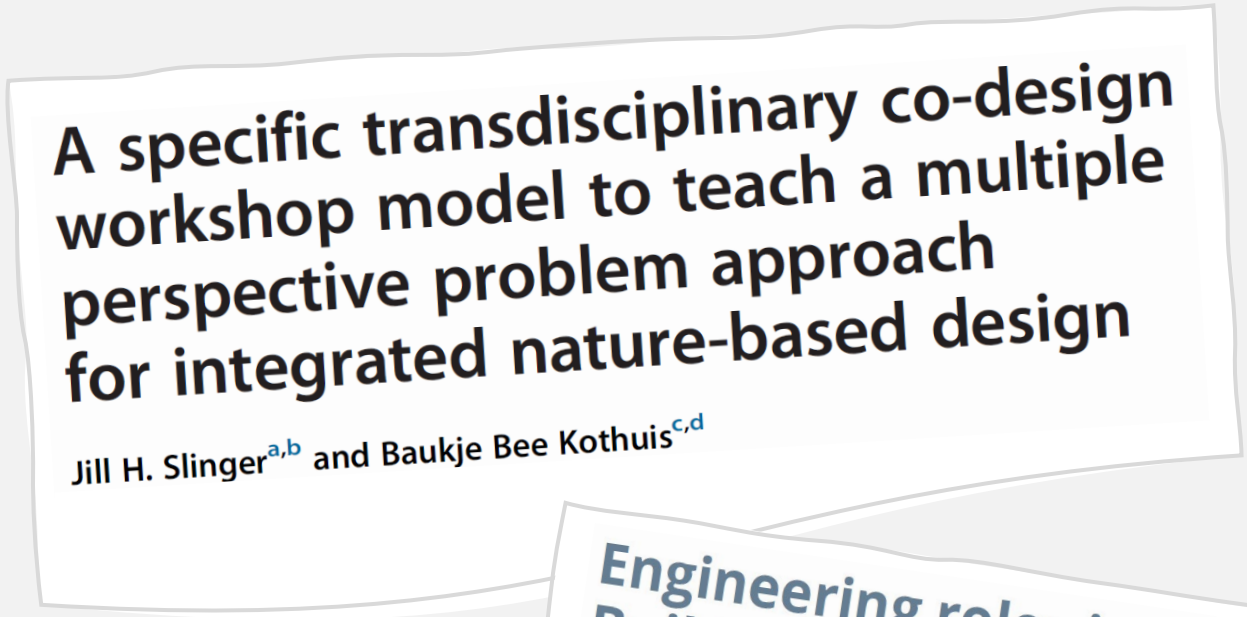


Lodder, Q.J. (2024). Connecting science and policy in Dutch coastal management. The role of system understanding and conceptual models. PhD Dissertation, Delft University of Technology, Delft, Netherlands.

Transdisciplinary Lab for Learning and Research

Building on 30-years of interdisciplinary research, TPM takes on the transdisciplinary challenge

Teaching, Research and Capacity-building


A specific transdisciplinary co-design workshop model to teach a multiple perspective problem approach for integrated nature-based design

Jill H. Slinger[a,b] and Baukje Bee Kothuis[c,d]


Engineering roles in Building with Nature interdisciplinary design

Educational experiences

Renate Klaassen[1], Baukje Kothuis[2], & Jill Slinger[3,4]

TU Delft

AWaRMN

RHODES UNIVERSITY
Where leaders learn

TU Delft

FEDERAL UNIVERSITY OF TECHNOLOGY MINNA
Technology for Empowerment

MAKERERE UNIVERSITY

Funded by the Intra-Africa Academic Mobility Scheme of the European Union

African Union

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TU Delft

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Where leaders learn

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AgroParisTech

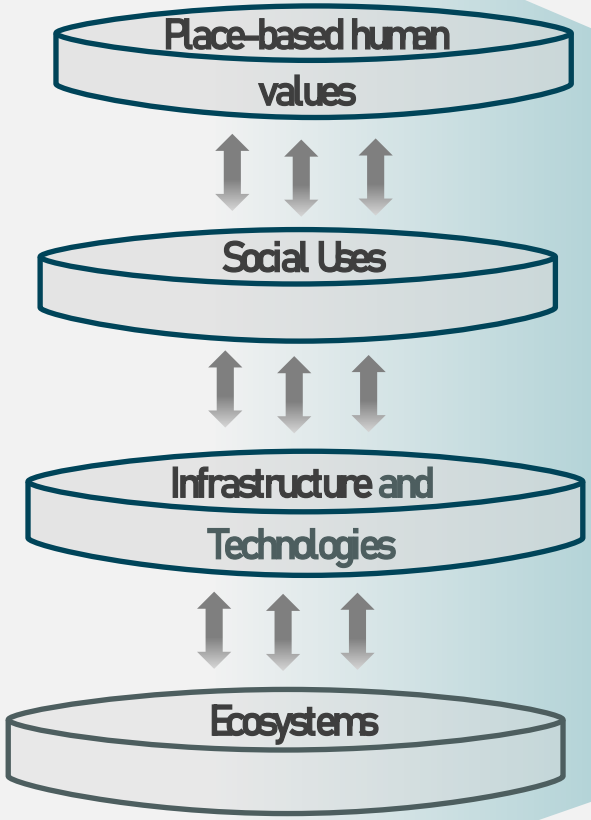
INRAE

Sagesse Devoir
Ecole Polytechnique Thiès

LUX MEA LEX
SIGILLUM UNIVERSITATIS CHEIKH ANTA DIOP DAKARENSIS

Transdisciplinary Co-Design

Meta-design, crafting and evaluating complexity-informed, ecosystem-based, stakeholder-inclusive and value-sensitive interventions at the interface between science and policy



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- (Action towards) Locally relevant ecosystem-based outcomes
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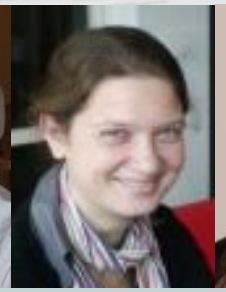
Acknowledgements

with grateful thanks to…

PhDs


Marcel Marchand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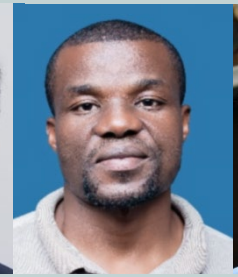
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