



Navigating Risk to Resilience

Examining the impact of water risks on the investment decision-making process in polder-area development projects in the Netherlands.

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MSc Architecture, Urbanism and the Built Environment, track: Management in the Built Environment

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 **TU Delft**

FAKTON 







Polder
/'pəʊldə/

*a piece of low-lying land reclaimed from the sea or a river and protected by dykes, especially in the Netherlands.
(OxfordLanguages, n.d.)*



Context

Climate change



Low laying polders

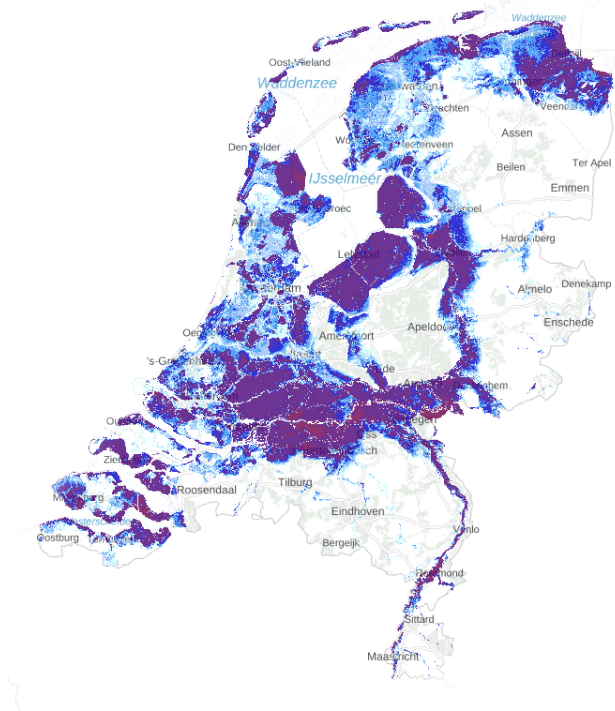


Housing demand



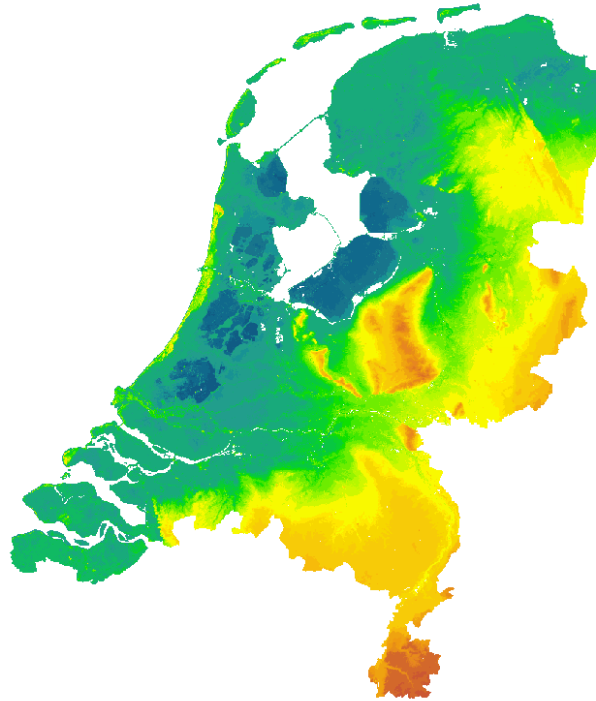
Problem statement

Climate change



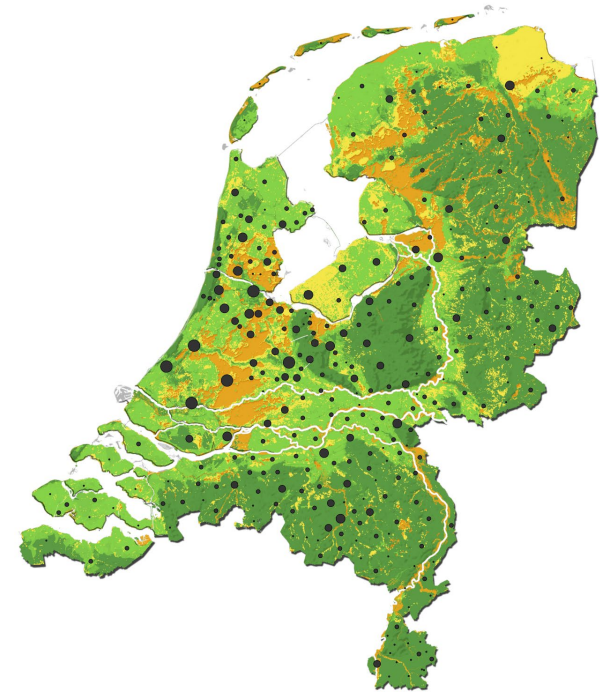
Areas prone to flooding.

Low laying polders



Elevation map of the Netherlands.

Housing demand



Building constraints due to soil & climate.

Problem statement

Climate change



+

Low laying polders



+

Housing demand



Problem statement

Climate change



+

Low laying polders



+

Housing demand



=

Challenge of effective implementation of
climate adaptation measures

“ We are increasingly reaching our limits now, due to intensive usage of land and climate change. By taking water into greater consideration, we can continue to live and work in the Netherlands in the future. ”

– Minister Harbers

Content



I

Research
approach



II

Theoretical
findings



III

Empirical
findings



IV

Discussion &
Conclusion



V

Limitations &
Recommendations

Chapter I

Research approach

Research questions
Research method



Research questions

“In which way do water risks impact the investment decision-making process in polder-area development projects in the Netherlands?”

Research questions

“In which way do water risks impact the investment decision-making process in polder-area development projects in the Netherlands?”

SQ1 – How do policy- and decisionmakers navigate the path toward reducing water-related risks over time?

SQ2 – What does the investment decision-making process in urban area development entail?

SQ3 – What are the standpoints of stakeholders involved in the decision-making process regarding adaptation investments?

SQ4 – To what extent can the allocation of responsibility and risks be distributed between public and private stakeholders in polder-area development?

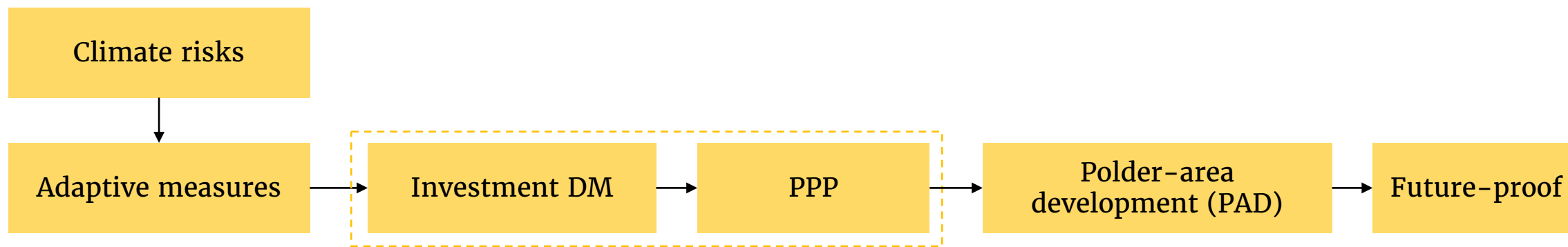


Figure 1. Conceptual framework (author).

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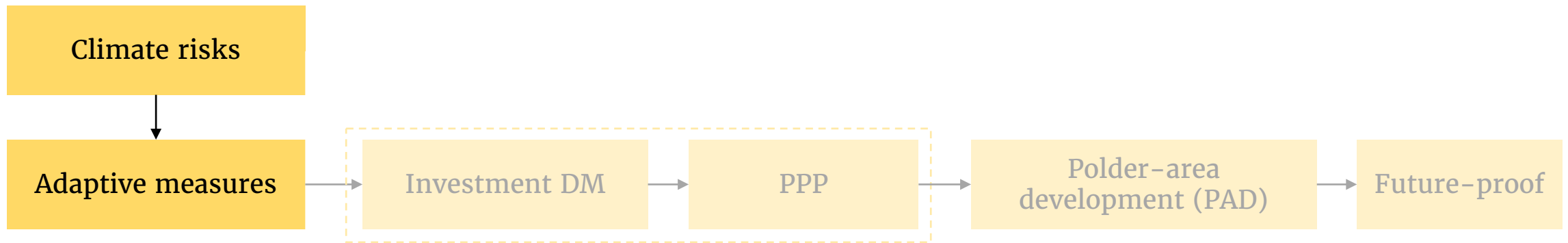


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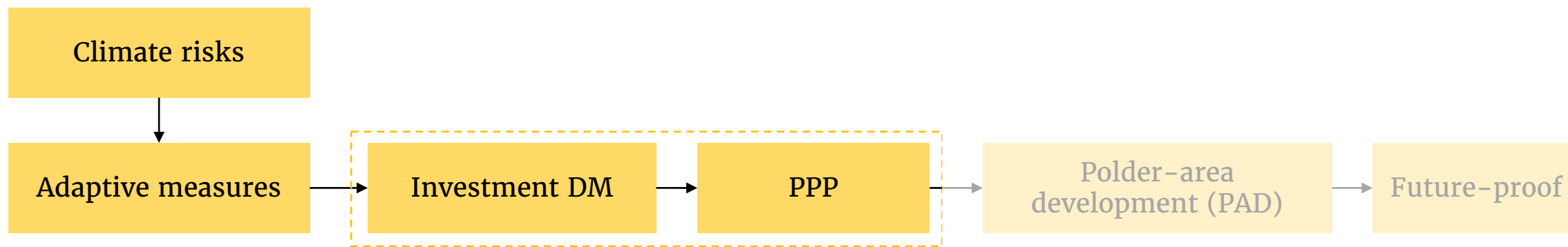


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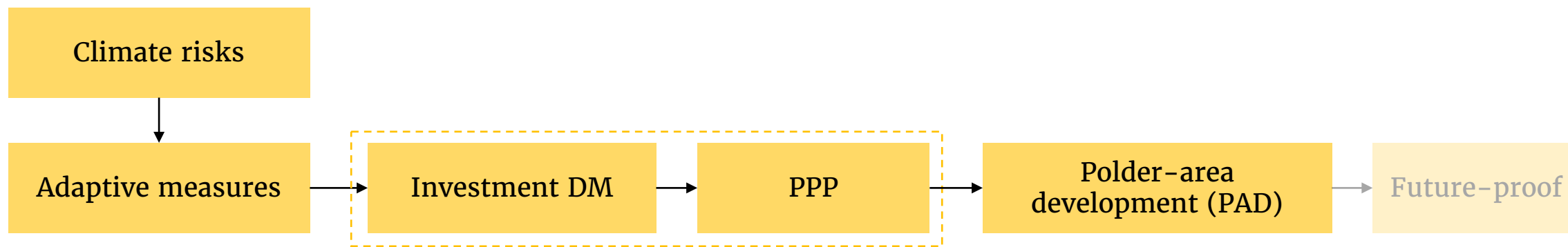


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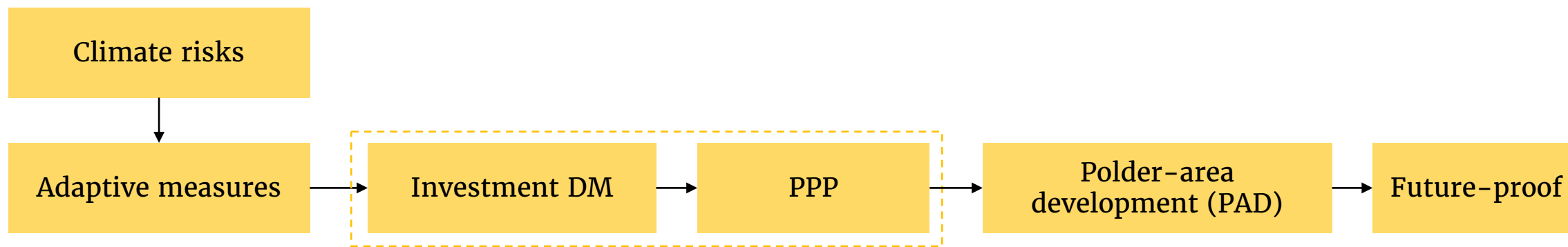


Figure 1. Conceptual framework (author).

Research design

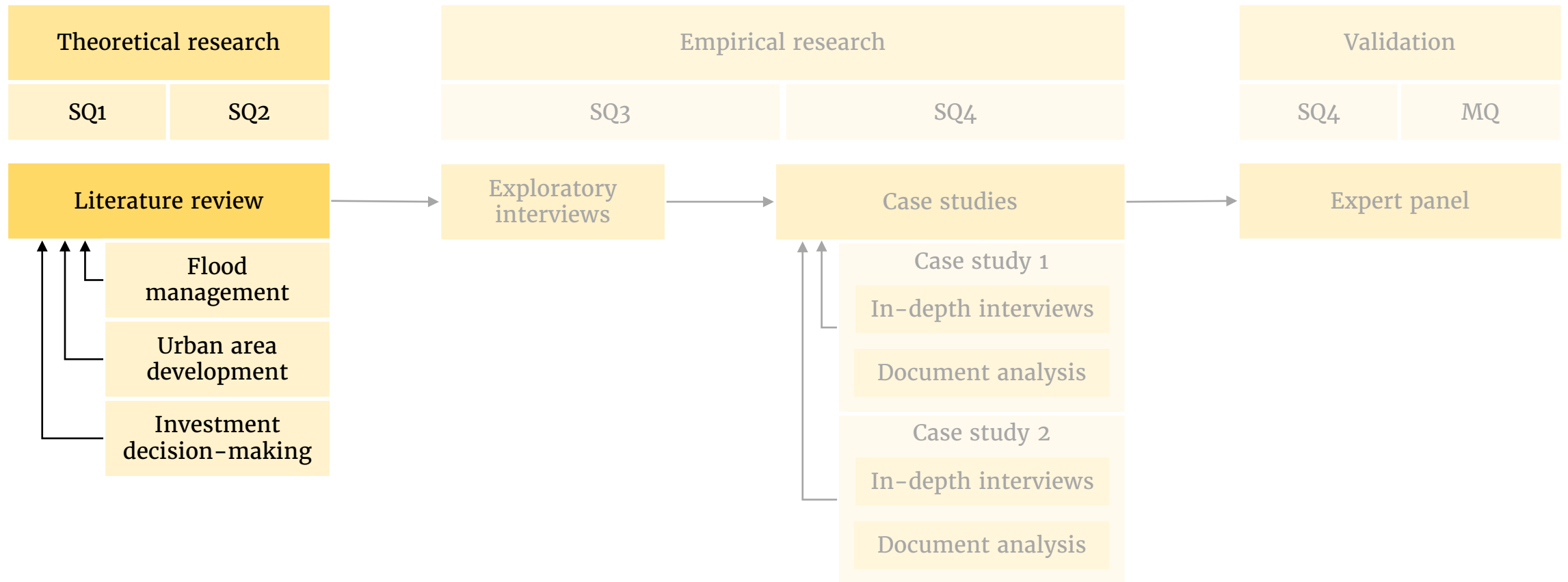


Figure 2. Research design (author).

Research design

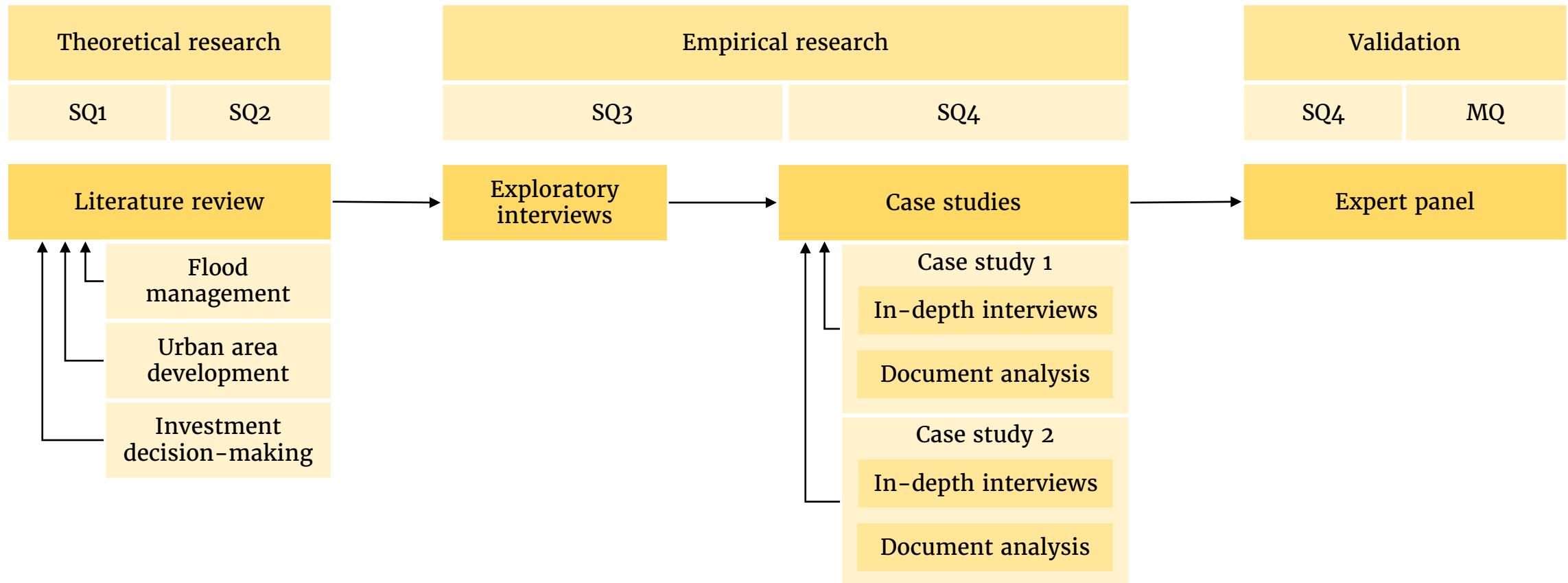


Figure 2. Research design (author).

Data analysis

Exploratory interviews

Case studies

In-depth interviews

Expert panel

Data analysis

Exploratory interviews

Case studies

In-depth interviews

Expert panel

Interviews with 5 experts involved in climate adaptation in the built environment.

Serving as a foundation for the case studies, offering focal points for in-depth interviews and a deeper understanding of the three concepts.

Table 1. Interviewees of exploratory interviews

Interviewee	Company	Function
I	Deltares	Expert Water- and Soilsystems
II	Fakton Consultancy	Expert-Market Director
III	Verbond van Verzekeraars	Policymaker
IV	Ministry of I&W	Senior Policymaker
V	ASR Real Estate	Researcher

Data analysis

Exploratory interviews

Case studies

In-depth interviews

Expert panel

Document analysis serves as **triangulation method**. Helps to understand the context and the process.

The documents are mostly public **policy and decision documents**.

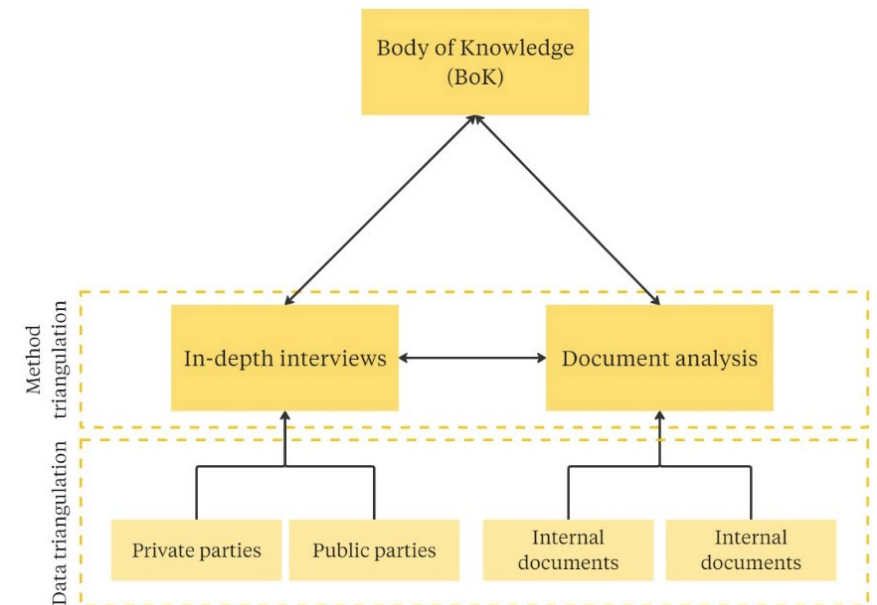


Figure 3. Triangulation (Carter, Bryant-Lukosius, Blythe, & Neville, 2014)

Data analysis

Exploratory interviews

Case studies

In-depth interviews

Expert panel

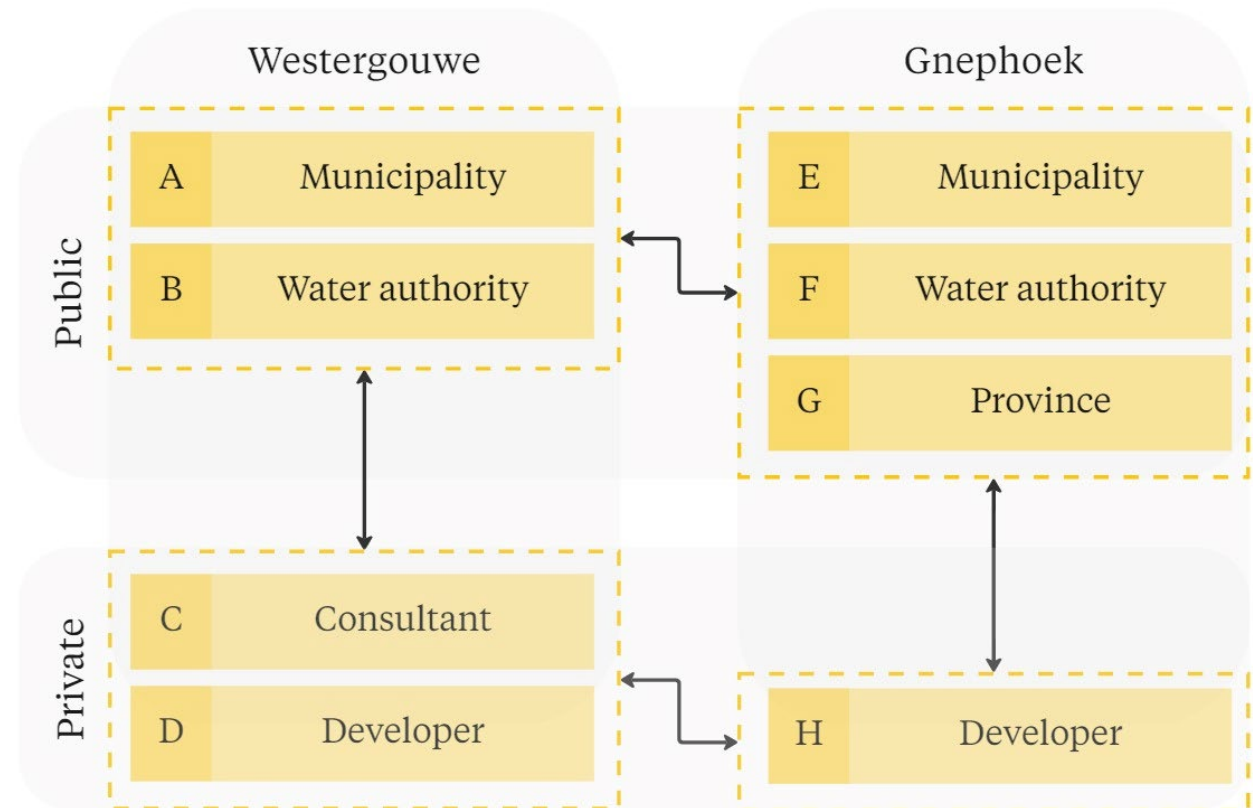


Figure 4. Cross-case and -stakeholder analysis

Data analysis

Exploratory interviews

Case studies

In-depth interviews

Expert panel

Expert panel with **4 experts** involved in urban area development, with an expertise in **public-private partnerships and/or climate adaptive development**.

Table 2. Interviewees of the expert panel

Attendance	Company	Function
Consultant	Fakton Consultancy	Senior-Consultant
Consultant	Fakton Consultancy	Partner
Developer	Fakton Development	Director
Developer	Fakton Development	Partner

Chapter II

Theoretical research

Water management
Urban area development
Investment decision-making



Literature review

Water management	Urban area development	Investment decision-making
Flood management in the Netherlands	Public and private systems	Land Exploitation
Disaster studies	Reducing capital commitment	Investment decision-making process
“Water- and Soil-centric” policy	Development phasing	Risk assessment
National Benchmark for CA	PPP governance structures	Cost-benefit analysis / CBW
“The Carrot” and “the Stick”	Governance structures	Multiple stream model of decision-making

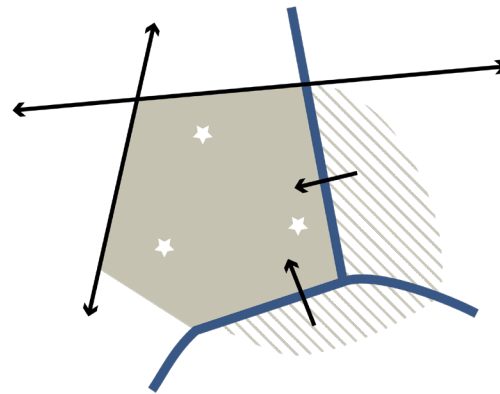
Literature review

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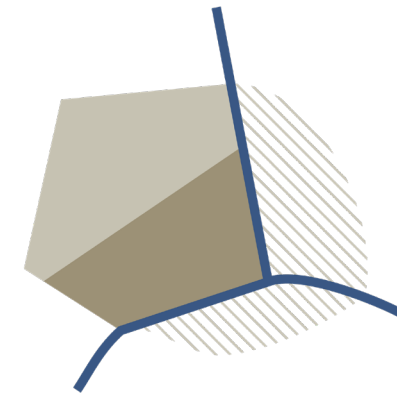
Literature review: *Public-Private Partnerships (PPPs)*



Plot with potentials for urban area development



Public infrastructure and services needed



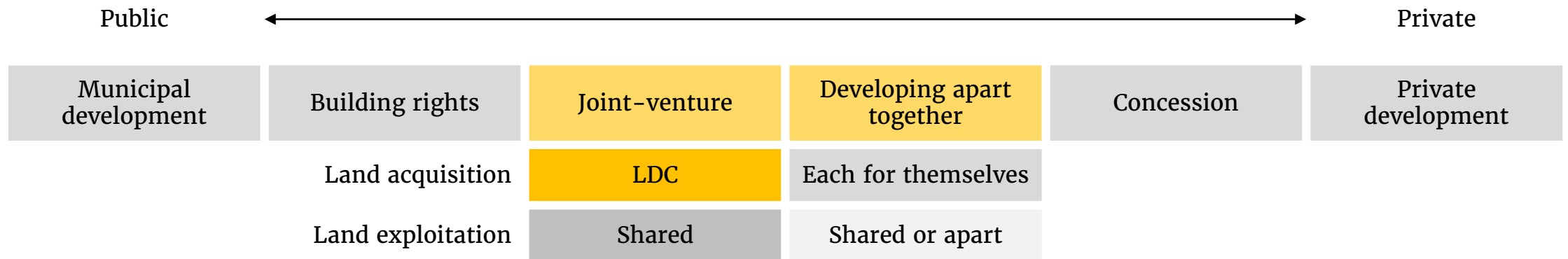
Fragmented landownership

PPPs = sharing risks and responsibilities

Figure 5. PPPs in practice (author; Zeeuw, 2019).



Literature review: *Public–Private Partnerships (PPPs)*



Literature review: *Land Exploitation*

Land Exploitation is based on residual land value

Literature review: *Land Exploitation*

Land Exploitation is based on residual land value

Returns

–

Investment costs

=

Residual land value

Figure 6. Residual land value (Zeeuw, 2019).

Literature review: *Land Exploitation*

Land Exploitation is based on residual land value

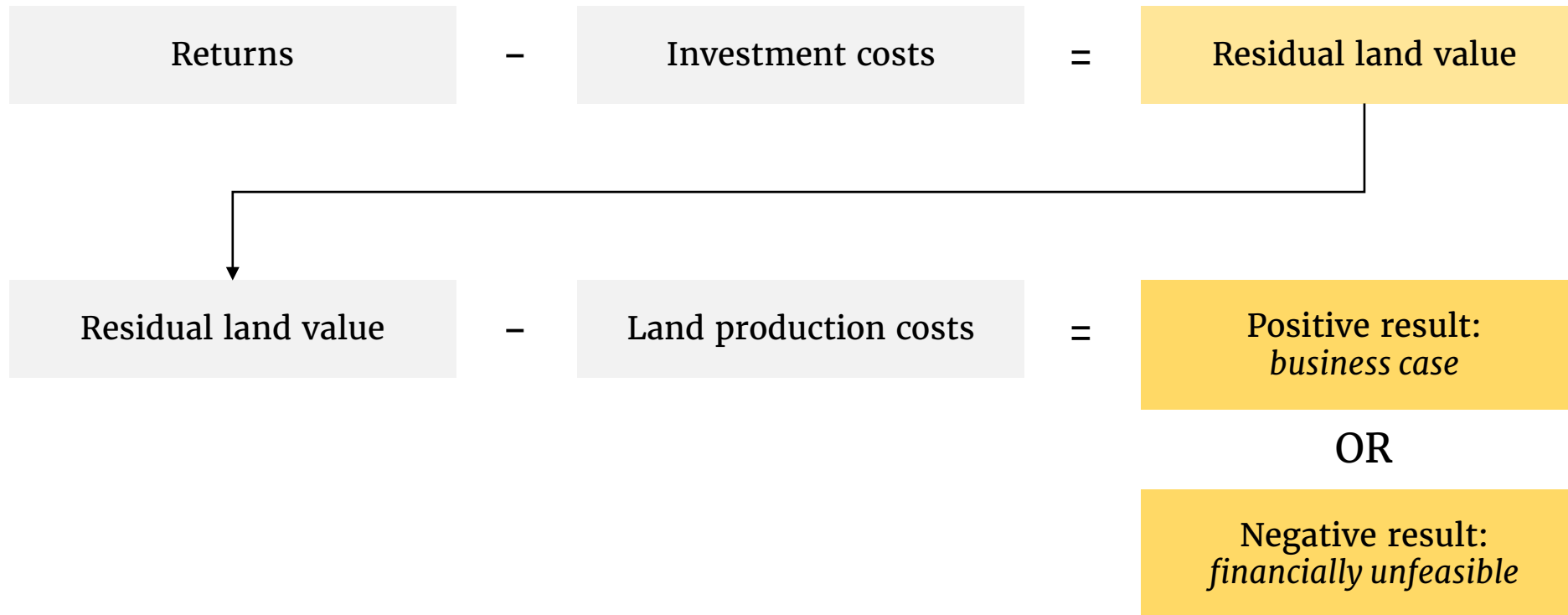


Figure 6. Residual land value (Zeeuw, 2019).

Literature review: *Land Exploitation*



Figure 6. Real estate financing, land exploitation (Vlek et al., 2015).

Literature review: *Land Exploitation*

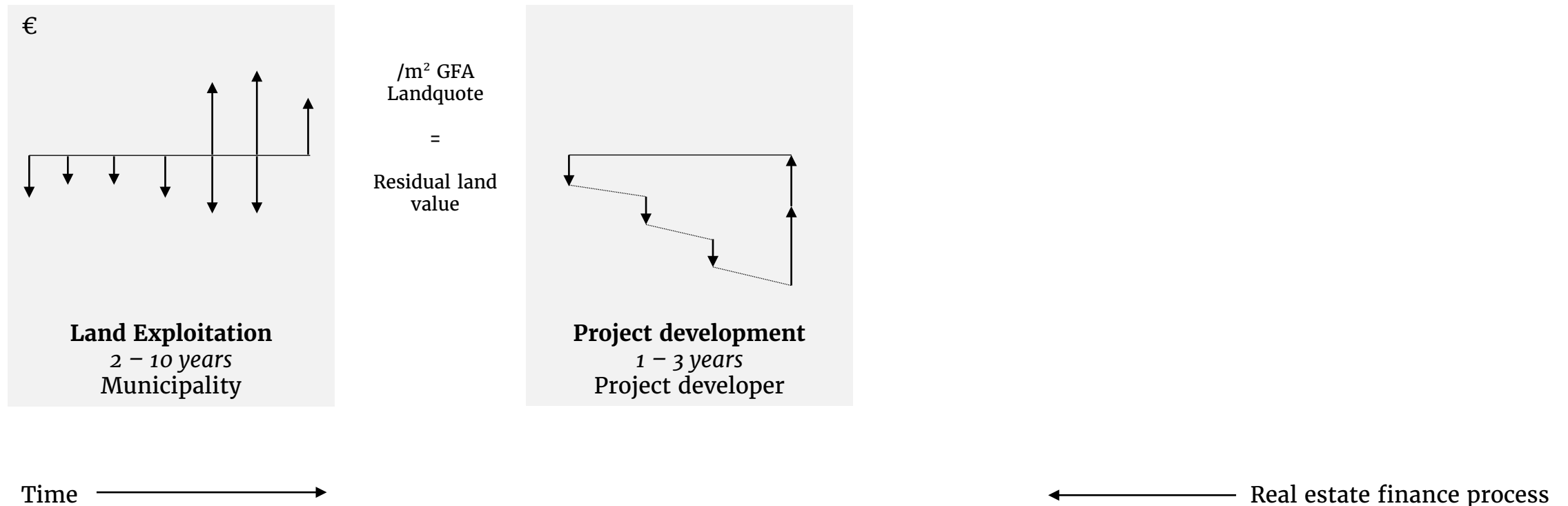


Figure 7. Real estate financing, land exploitation (Vlek et al., 2015).

Literature review: *Land Exploitation*

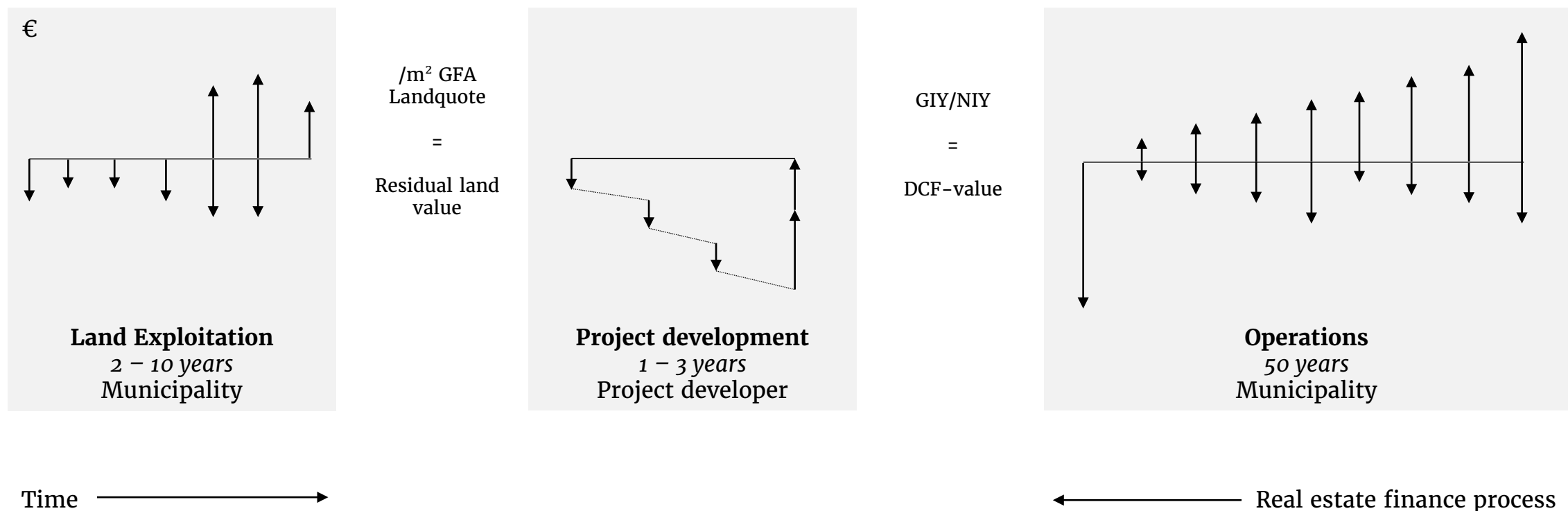


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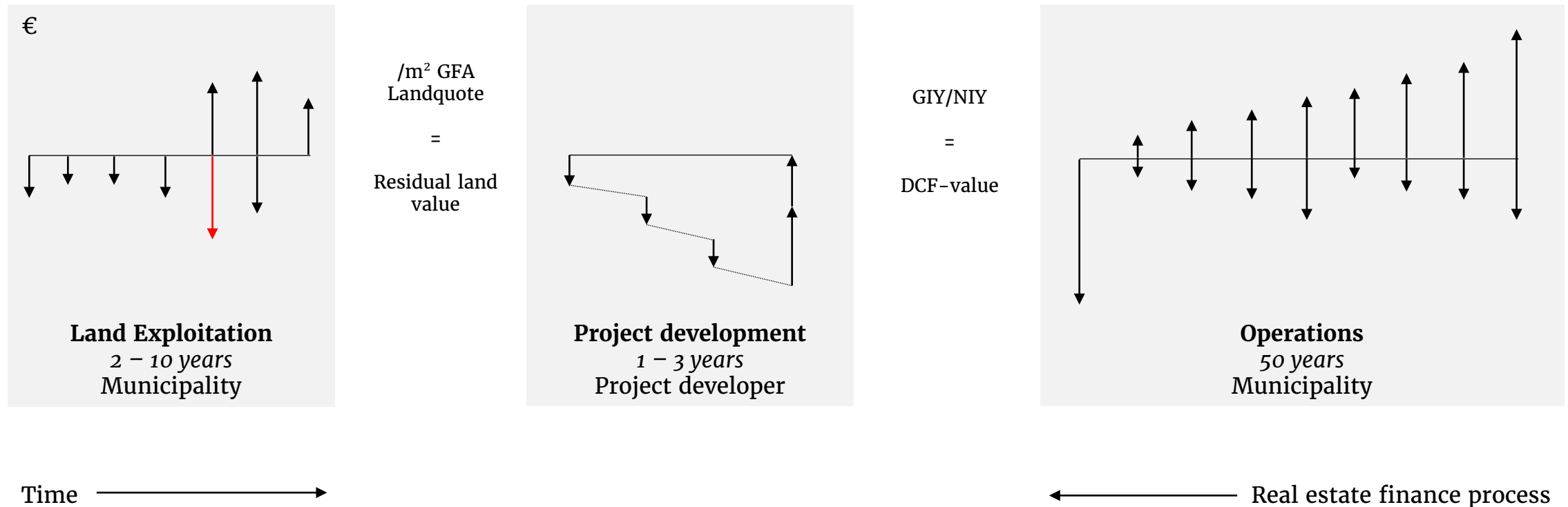


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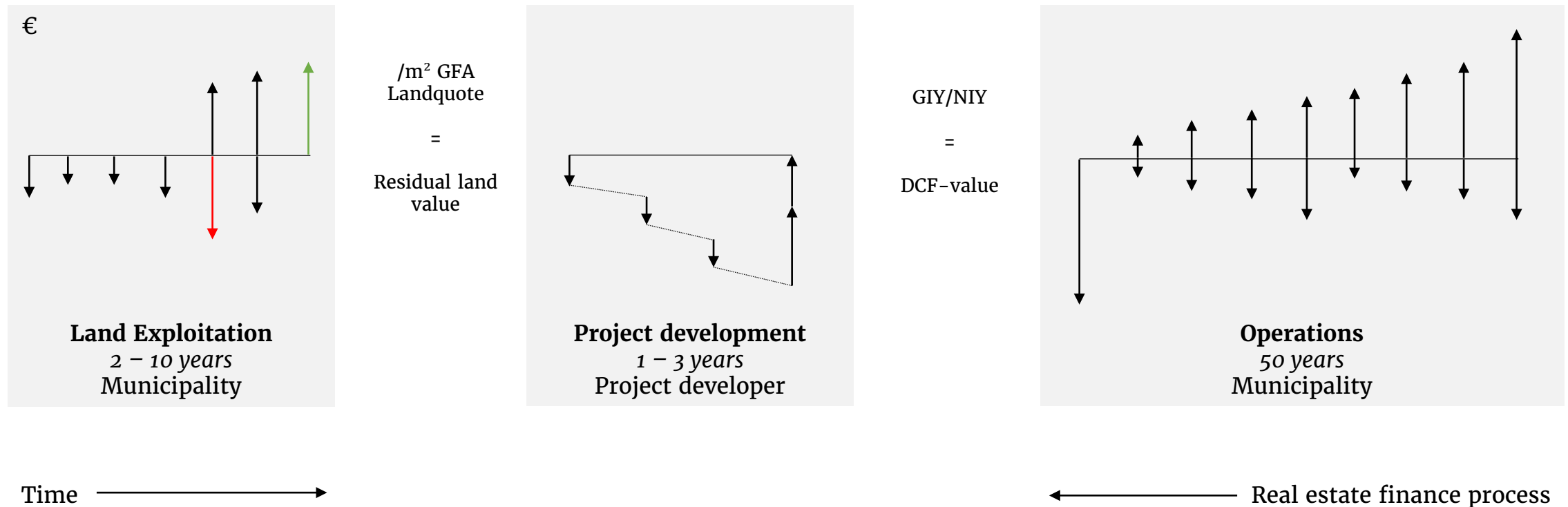


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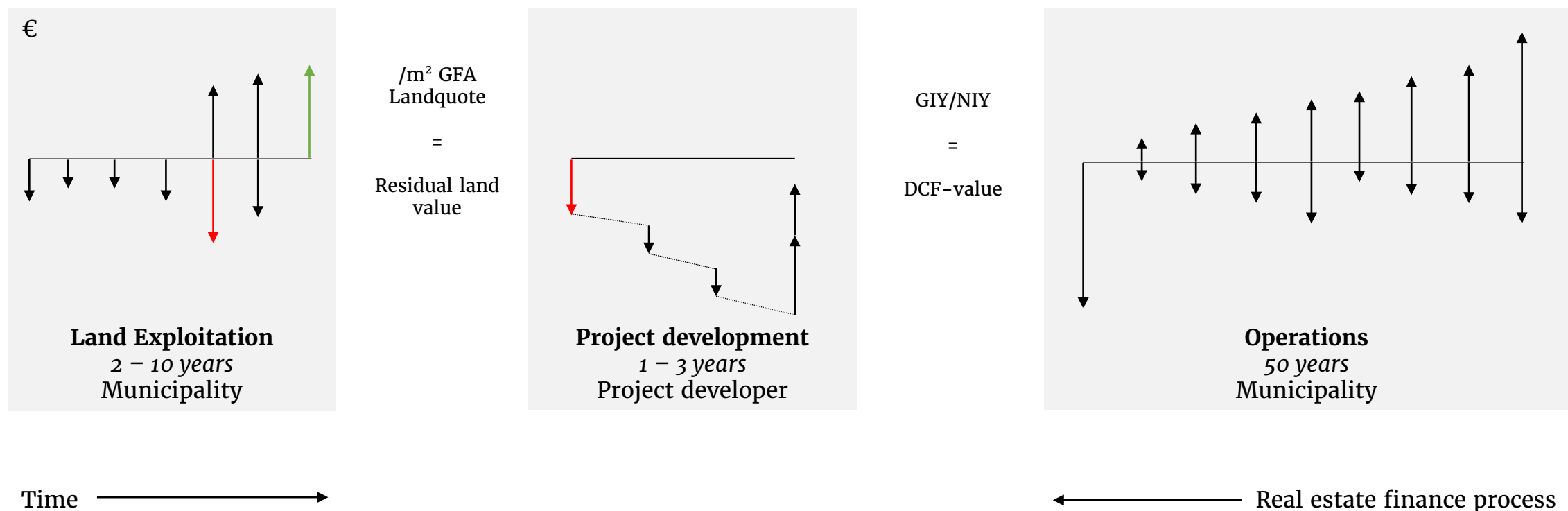


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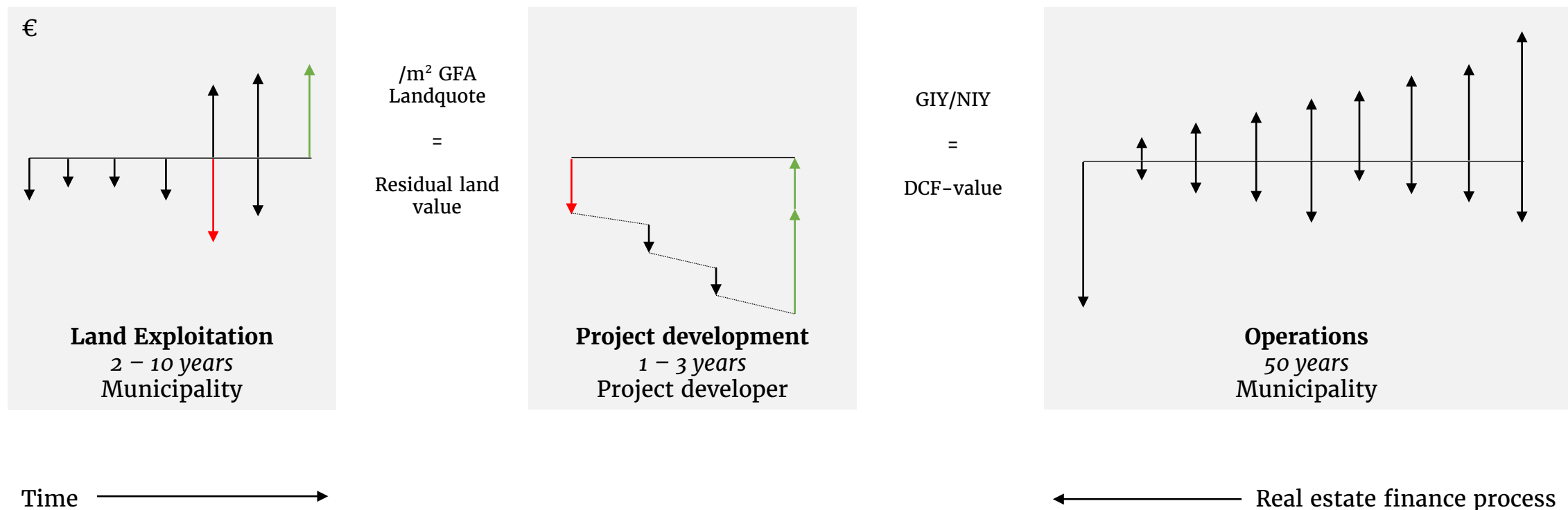


Figure 7. Real estate financing, land exploitation (Vlek et al., 2015).

Chapter III

Empirical research

Case studies
Findings





Westergouwe – Gouda

Retrieved from: Westergouwe.nl

1

Case study



Westergouwe – Gouda

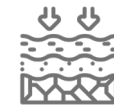
Retrieved from: [Westergouwe.nl](https://www.westergouwe.nl)

Characteristics of Westergouwe

Size:	200 ha
Dwellings:	4,500
Phase:	Realization phase
PPP-structure:	Developing apart together
Level:	-6,30m NAP



Flood risk

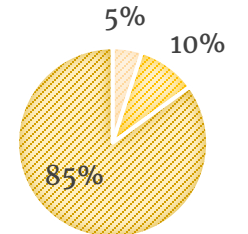


Soil subsidence



Water drainage

- Social
- Affordable
- Free market





2

Case study

Gnephoek – Alphen aan den Rijn

Retrieved from: landschap-stad.nl



Characteristics of Gnephoek

Size:	210 ha
Dwellings:	5,500
Phase:	Initiative phase
PPP-structure:	Joint-Venture
Level:	-4,0m NAP



Flood risk

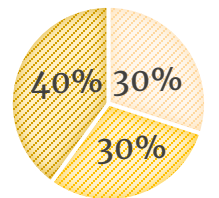


Soil subsidence



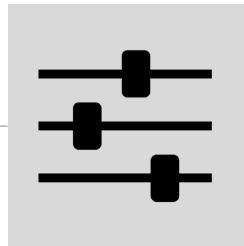
Water
drainage

- Social
- Affordable
- Free market

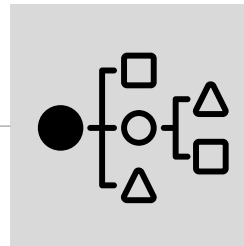


Gnephoek – Alphen aan den Rijn

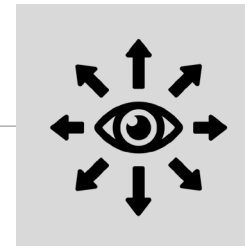
Cross-case and multi-stakeholder analysis



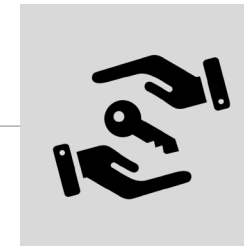
Steering with
levers to pull



Stakeholder
involvement

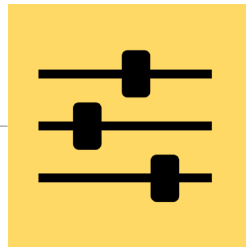


Critical
oversight



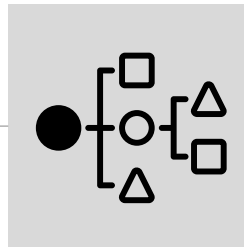
Influence of
land ownership

Cross-case and multi-stakeholder analysis

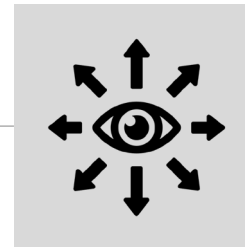


Steering with
levers to pull

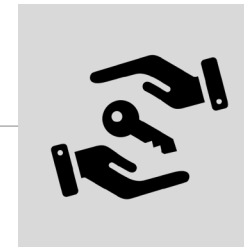
Housing density
Construction speed
Public space quality



Stakeholder
involvement

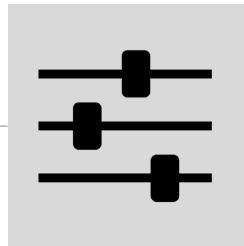


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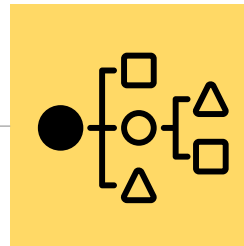


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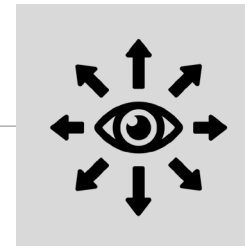
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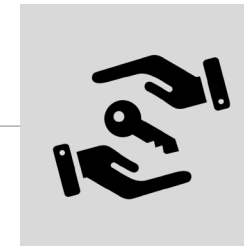
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Stakeholder
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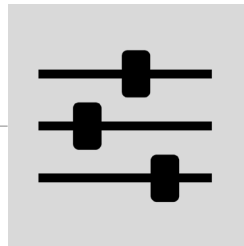
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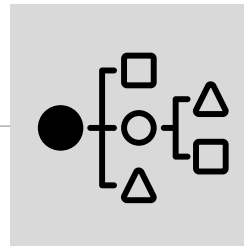
Influence of
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Different perspectives
Active steering

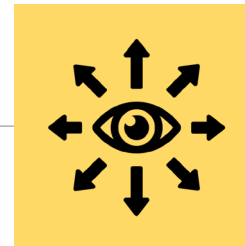
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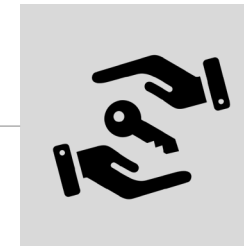
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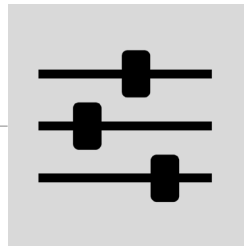
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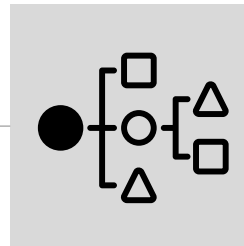
Influence of
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*Westergouwe example
for climate adaptive built
environment*

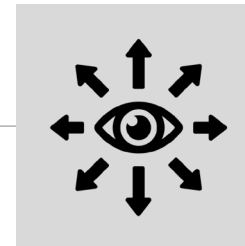
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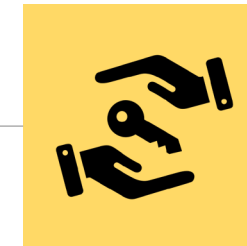
Steering with
levers to pull



Stakeholder
involvement



Critical
oversight



Influence of
land ownership

Land speculation
Sensible place to build
Early involvement

Chapter IV

Discussion & Conclusion



Discussion

Responsibility

Risk

Discussion

Dual Hat of the municipality

Private *lobbying* forces

“The Carrot” vs. “The Stick”

Responsibility

Risk

Discussion

Dual Hat of the municipality
Private *lobbying* forces
“The Carrot” vs. “The Stick”

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Responsibility

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Dual Hat of the municipality
Private *lobbying* forces
“The Carrot” vs. “The Stick”

Responsibility

Limited use of tools in investment DM
Physical risks well-defined
Non-physical risks influential factors
Focus on *collective CA measures*

Risk

Discussion

Dual Hat of the municipality
Private *lobbying* forces
“The Carrot” vs. “The Stick”

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Risk

Conclusion

MQ

“In which way do water risks impact the investment decision-making process in polder-area development projects in the Netherlands?”

Conclusion

MQ

“In which way do water risks impact the investment decision-making process in polder-area development projects in the Netherlands?”

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Integration of CA-measures into the investment DMP is currently **insufficient**. Public and private parties lack **the necessary tools**.

Conclusion

MQ

“In which way do water risks impact the investment decision-making process in polder-area development projects in the Netherlands?”

1 Integration of CA-measures into the investment DMP is currently **insufficient**. Public and private parties lack **the necessary tools**.

2 CA investment decisions are **financially driven** due to the Land Exploitation as evaluation tool.

Conclusion

MQ

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- 2 CA investment decisions are **financially driven** due to the Land Exploitation as evaluation tool.
- 3 **Dual positioning** of municipalities **complicates** the investment decision-making process regarding the implementation of CA-measures.

Conclusion

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- 3 **Dual positioning** of municipalities **complicates** the investment decision-making process regarding the implementation of CA-measures.
- 4 **Non-physical risks** have a **large impact** on the feasibility of the project, which hinders CA investments.

Conclusion

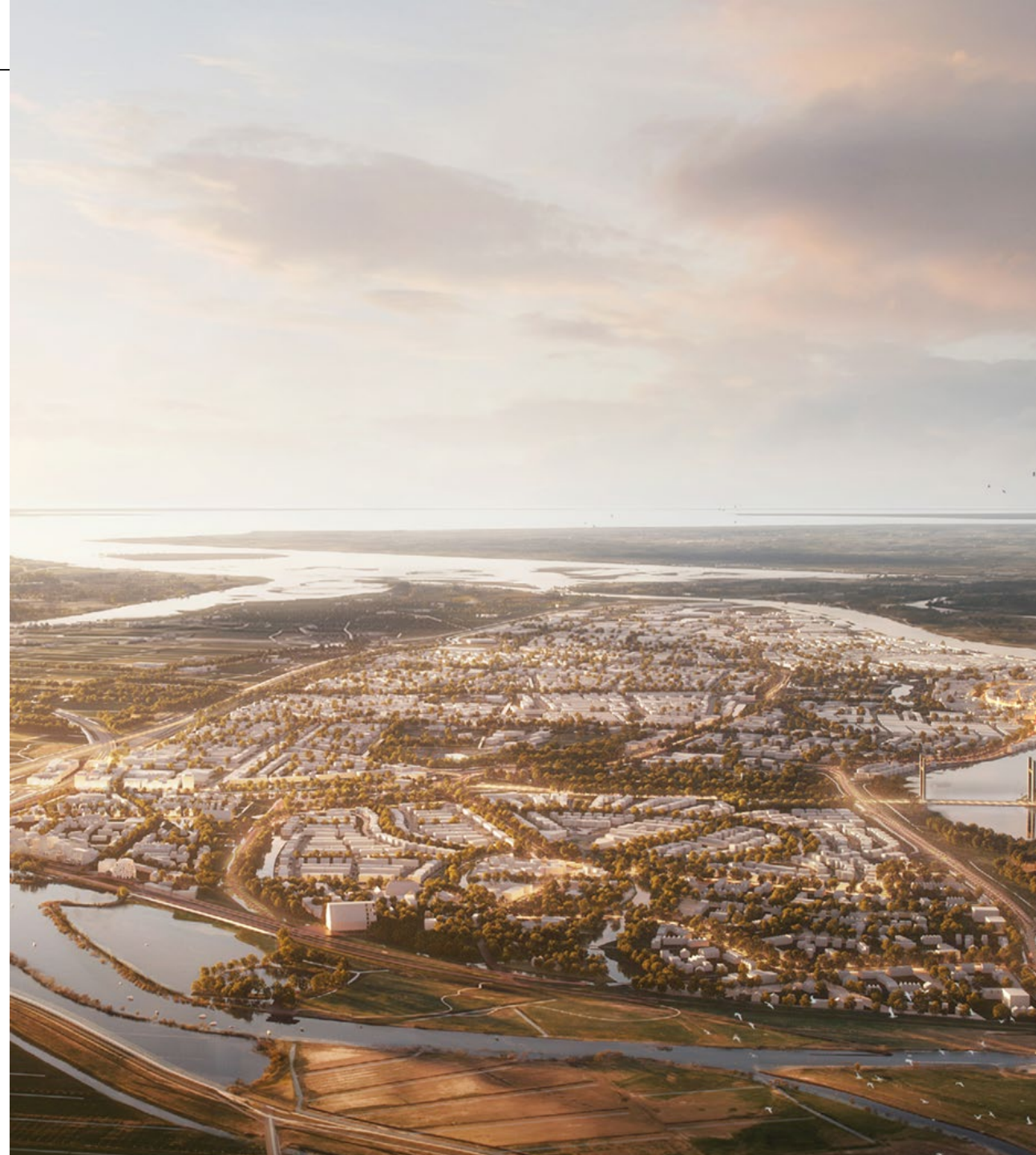
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- 3 **Dual positioning** of municipalities **complicates** the investment decision-making process regarding the implementation of CA-measures.
- 4 **Non-physical risks** have a **large impact** on the feasibility of the project, which hinders CA investments.

Chapter V

Limitations & recommendations



Limitations

Individual experiences
Reality may differ

1

Limitations

1 Individual experiences
Reality may differ

Triangulation

Limitations

1 Individual experiences
Reality may differ

2 Limited case studies
Willingness

Triangulation

Limitations

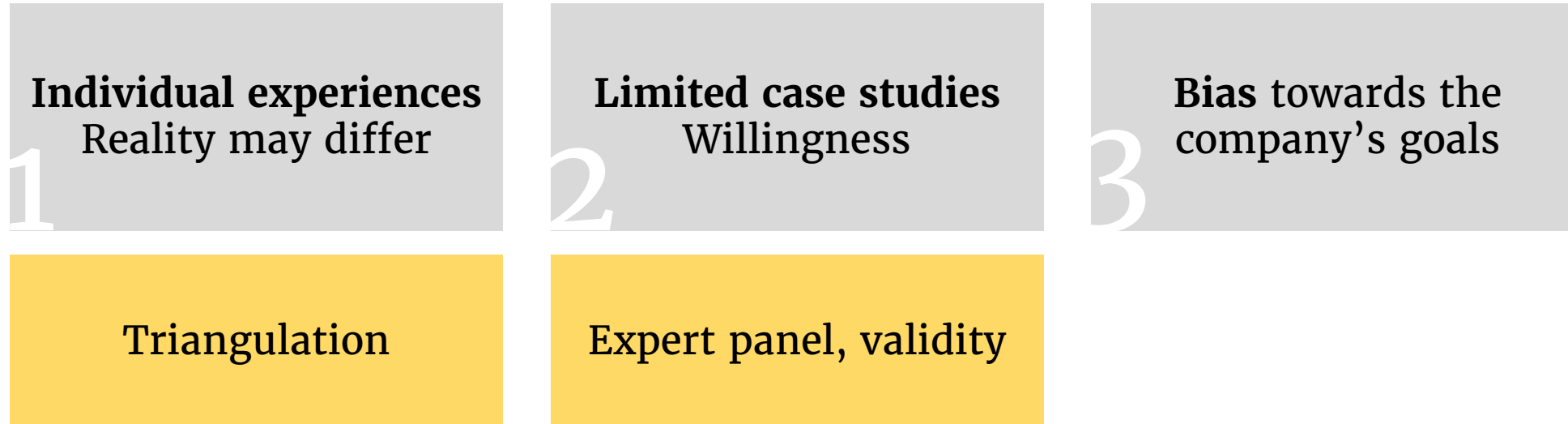
1
Individual experiences
Reality may differ

Triangulation

2
Limited case studies
Willingness

Expert panel, validity

Limitations

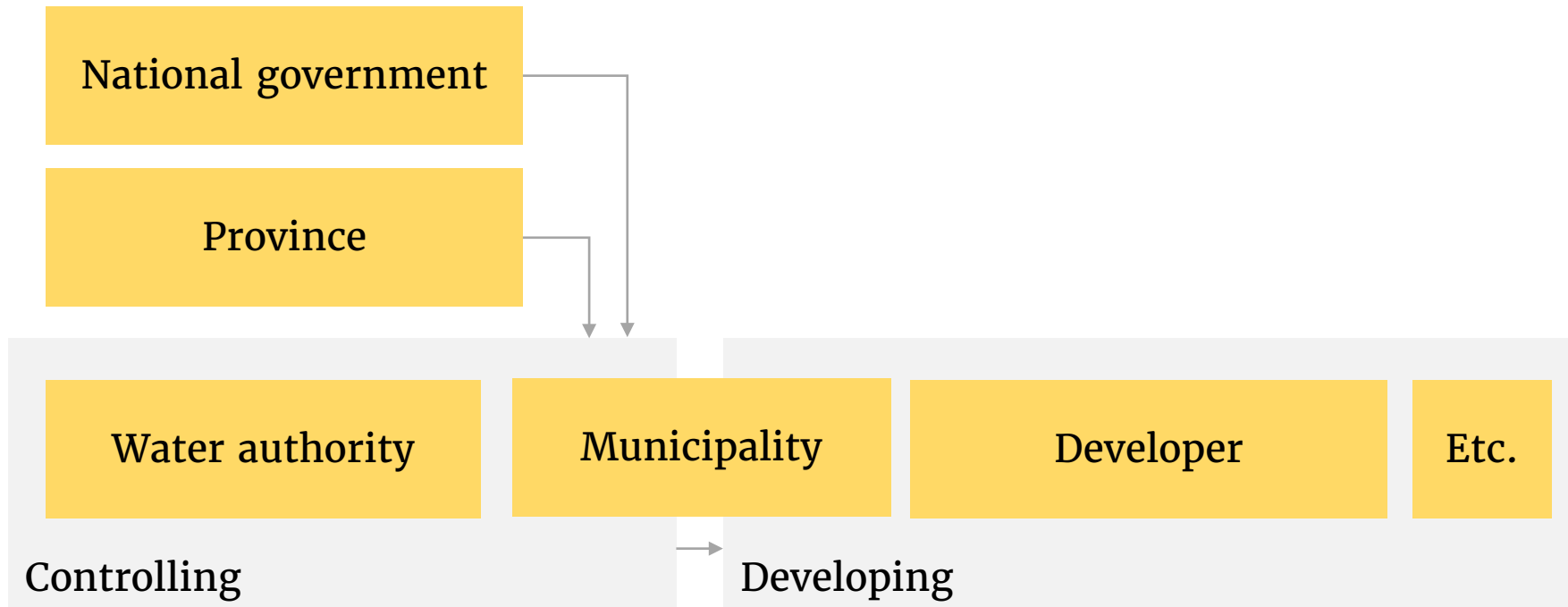


Limitations

1 Individual experiences Reality may differ	2 Limited case studies Willingness	3 Bias towards the company's goals
Triangulation	Expert panel, validity	No intervening No involvement

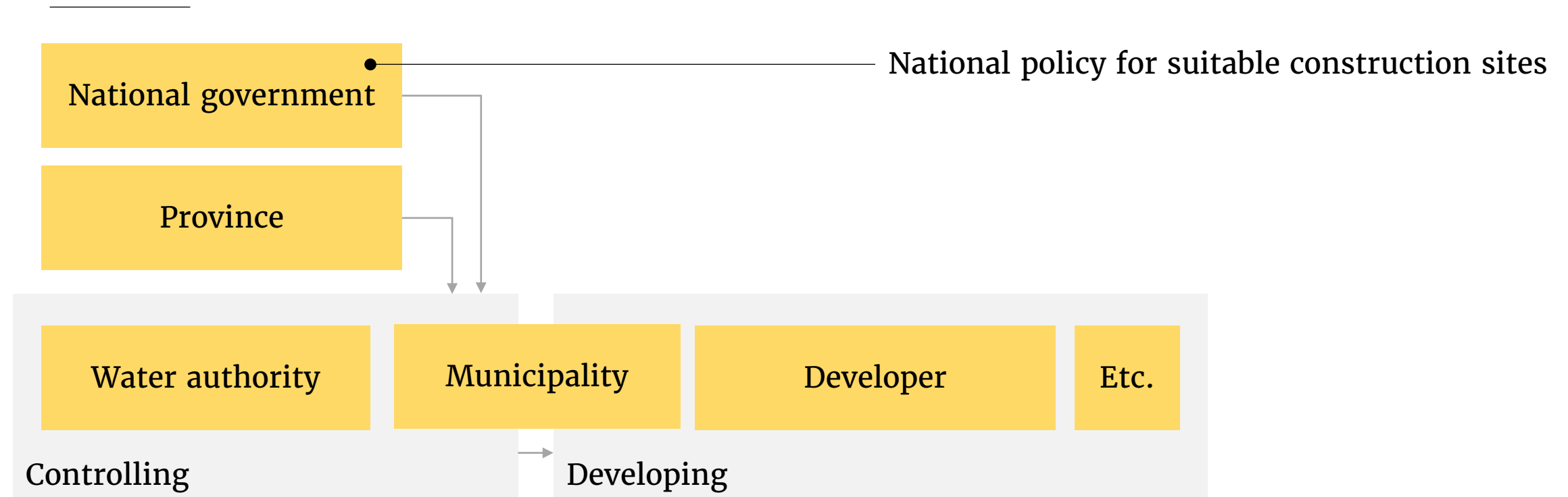
Recommendations

For implementation



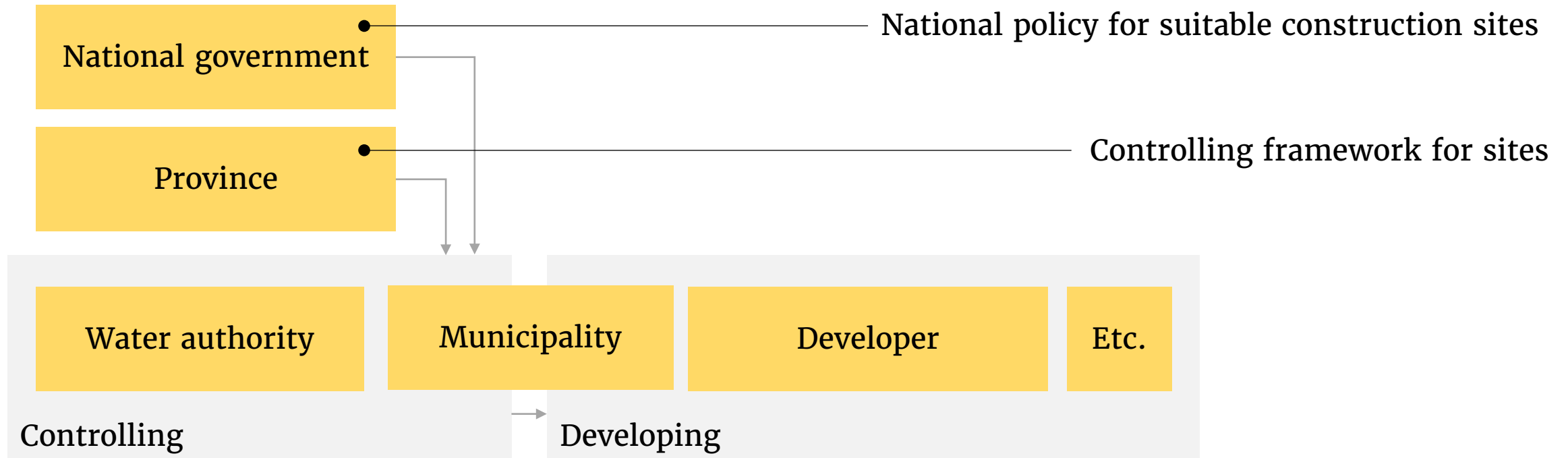
Recommendations

For implementation



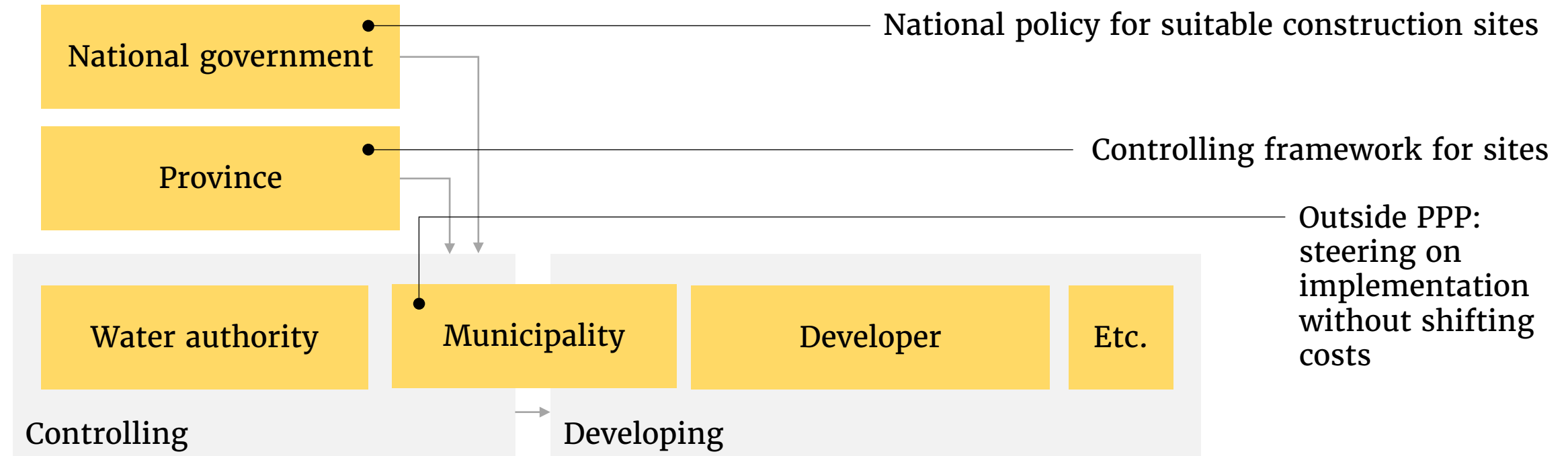
Recommendations

For implementation



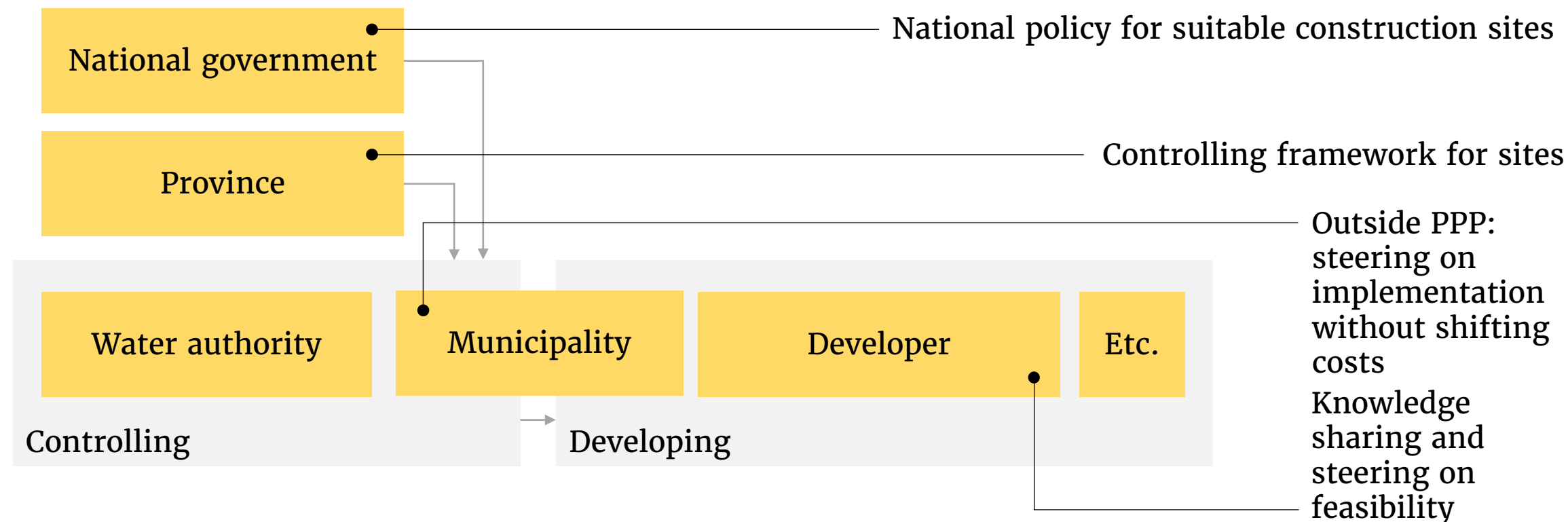
Recommendations

For implementation



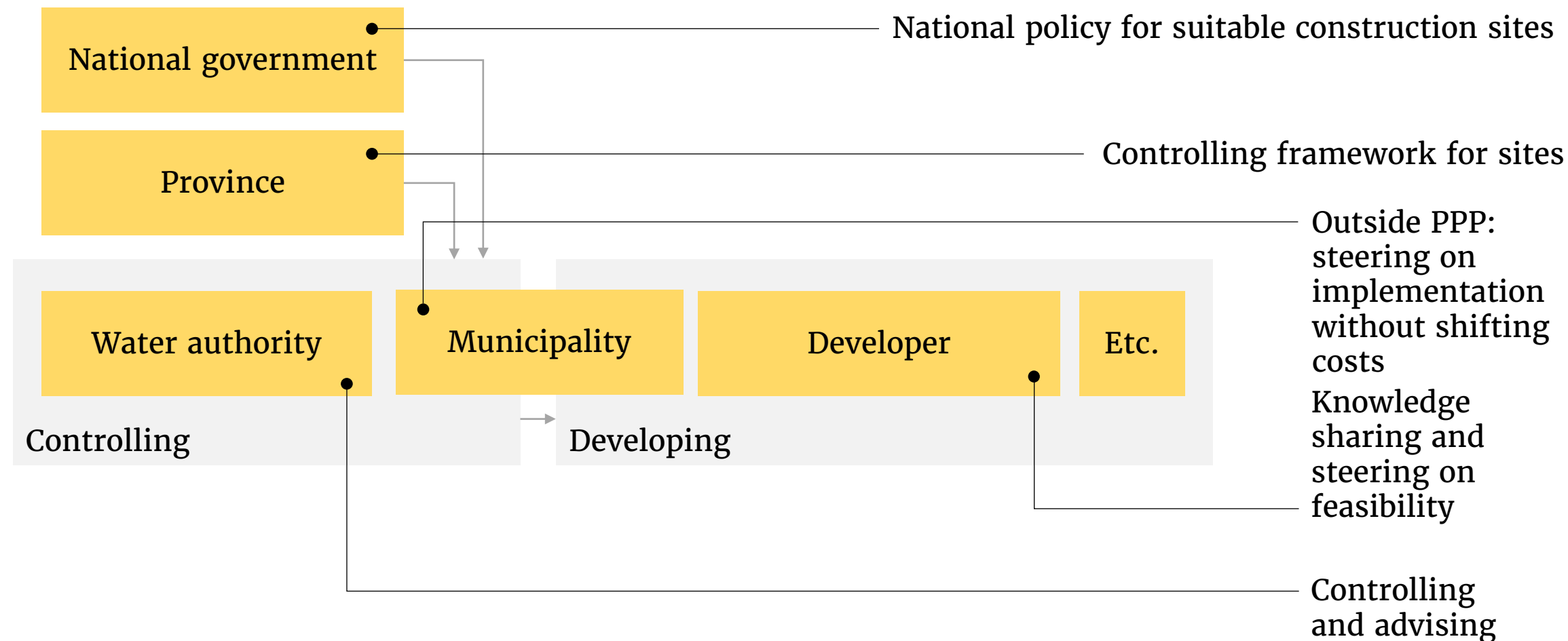
Recommendations

For implementation



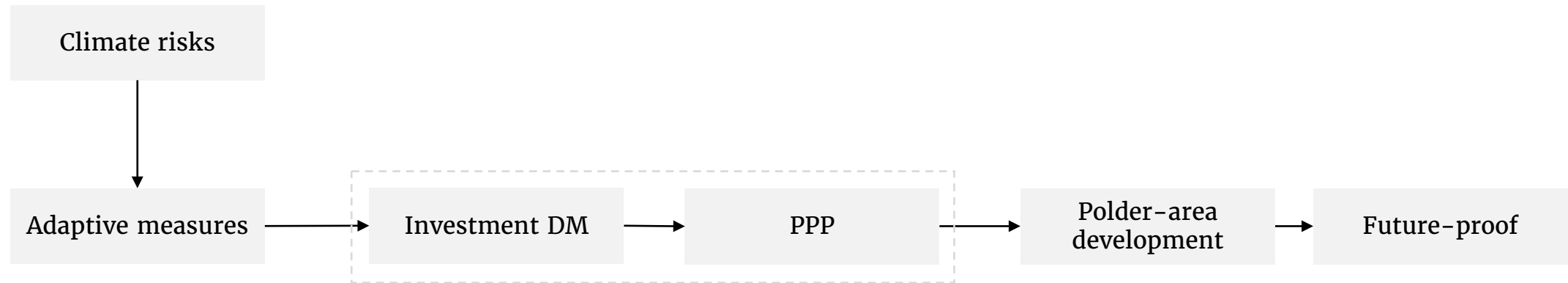
Recommendations

For implementation



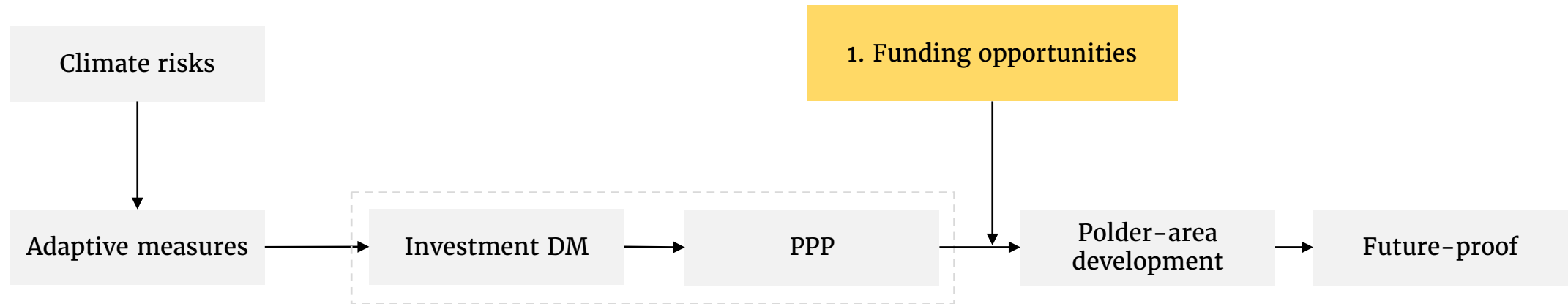
Recommendations

For further research



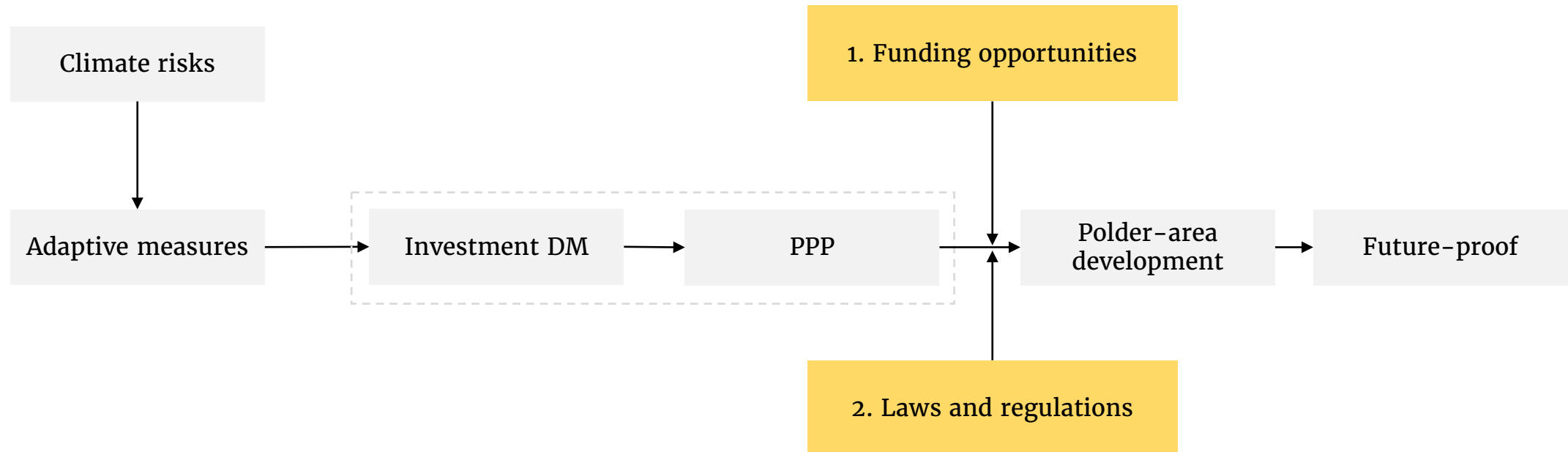
Recommendations

For further research



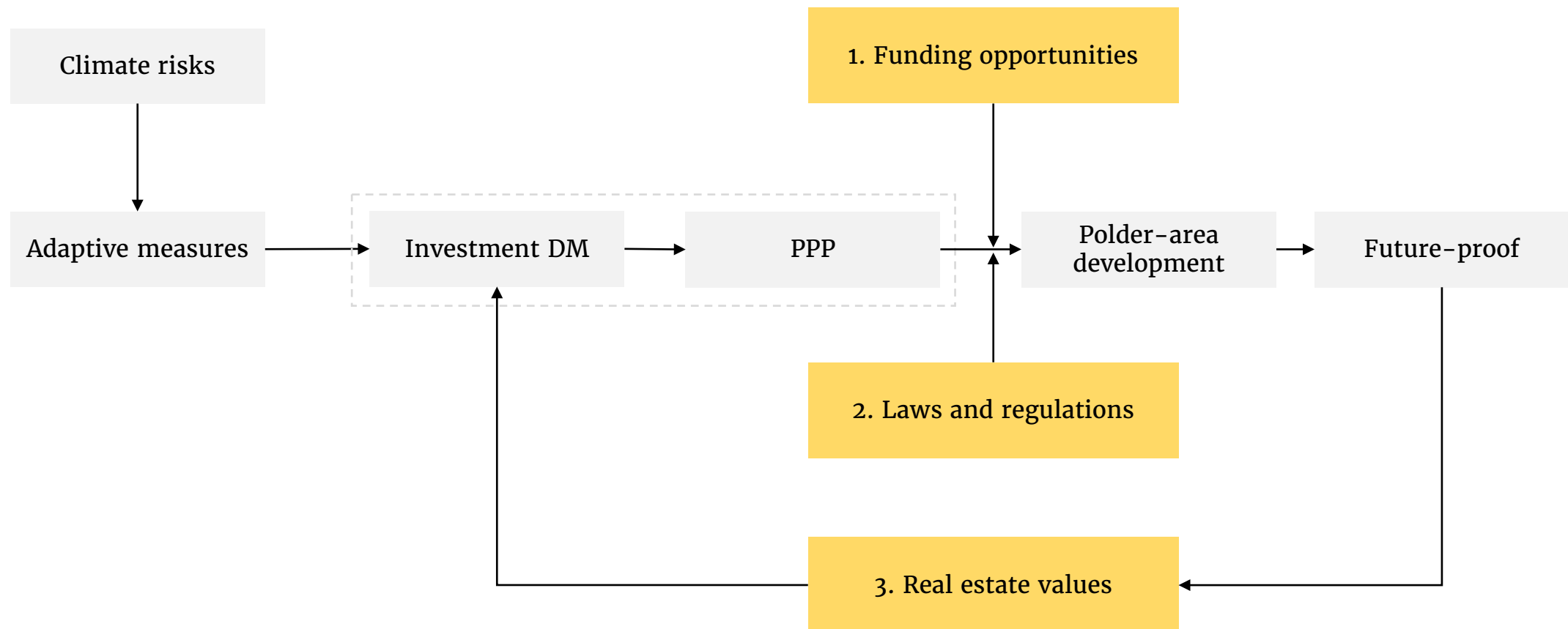
Recommendations

For further research



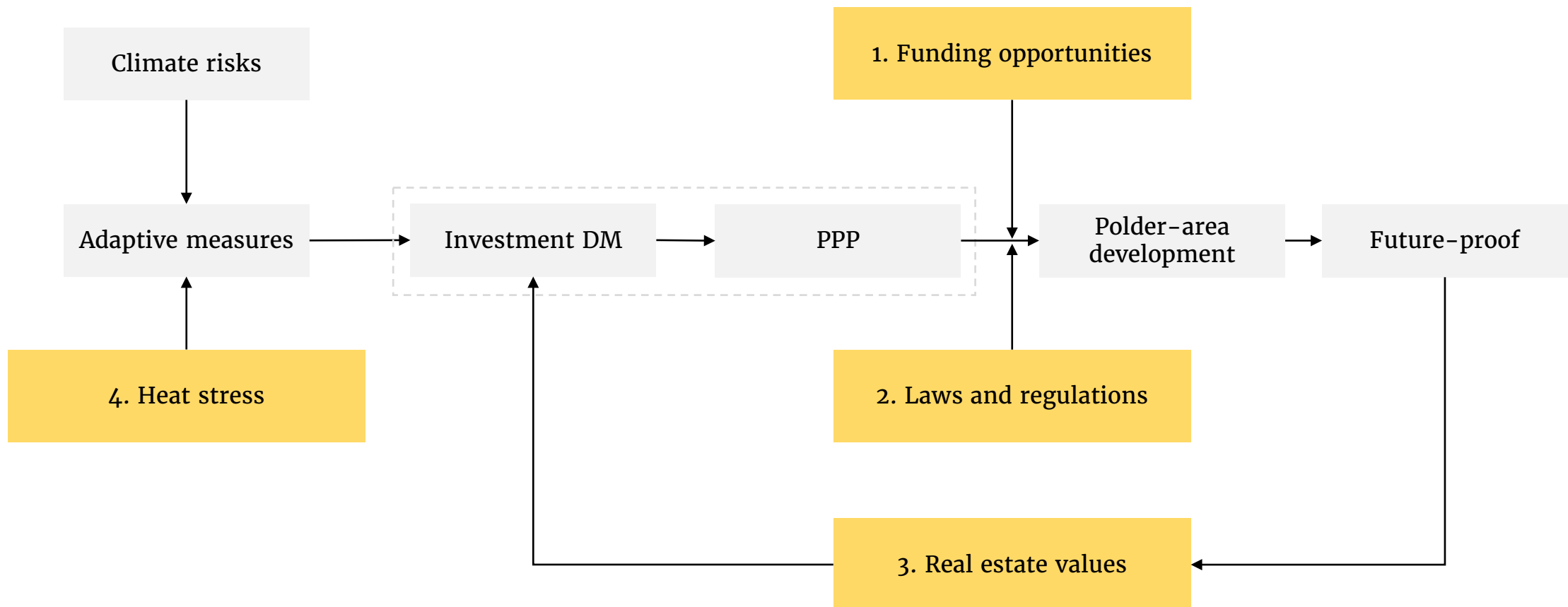
Recommendations

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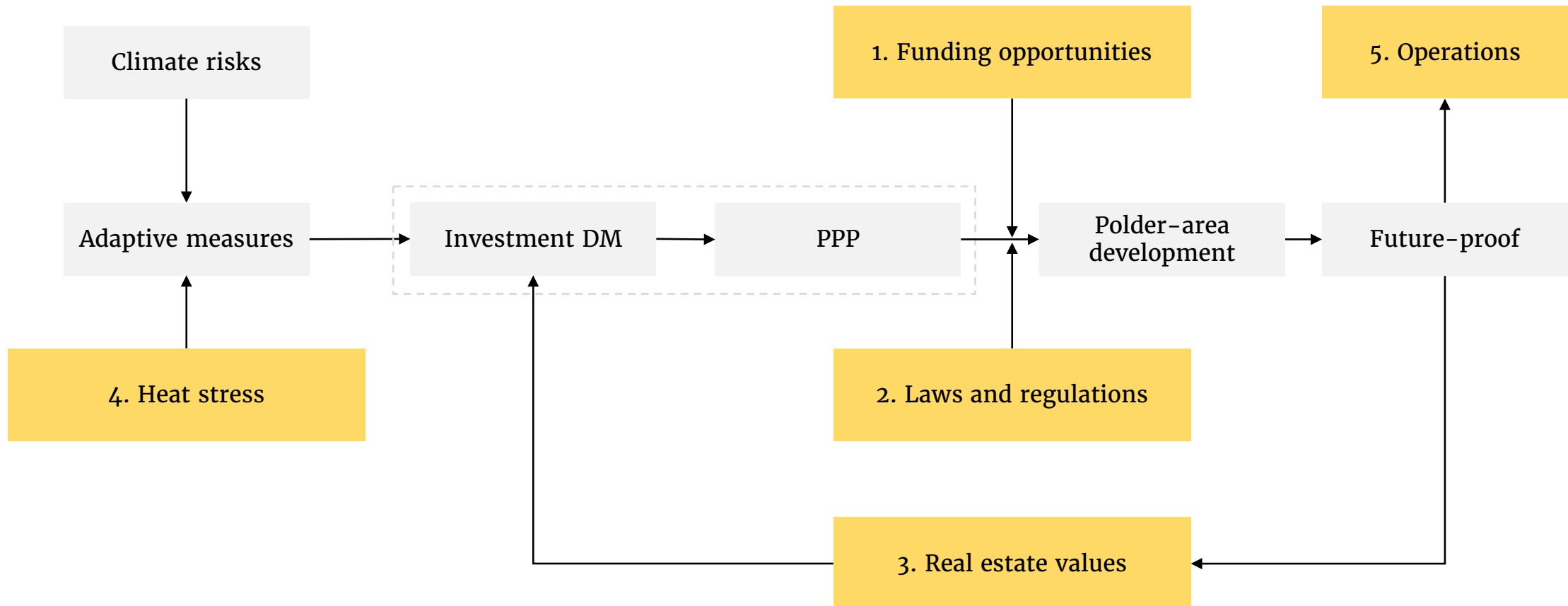
Recommendations

For further research



Recommendations

For further research



“ And who should foot the bill for this? Well, in the end, I could say, "We cover the land development costs," but, of course, we don't actually do that. It's simply embedded within the pricing of the homes. ”



Questions?

Navigating Risk to Resilience

Examining the impact of water risks on the investment decision-making process in polder-area development projects in the Netherlands.

Daniël Zantinge |

