WP4.1 Technical measures

In WP4 Measures and governance approaches

Land Subsidence in Urban Areas: Technical Mitigation and Prevention Measures

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1. Introduction

Subsidence affects major cities in Mexico, Indonesia, Thailand, Italy, United States of America, Nigeria, Japan, China and the Netherlands, among others.
It is a relatively slow process with moderate intensity, typically moving at few millimeters per year. Nevertheless, subsidence causes socio-economic distress, physical and environmental damages.

This research focuses on technical measures to mitigate and prevent subsidence and the damage it causes in urban areas.

The aim is to:

- Identify a systematic method to select suitable measures in each urban context.
- Assess the effectiveness of technical measures.

2. Definitions

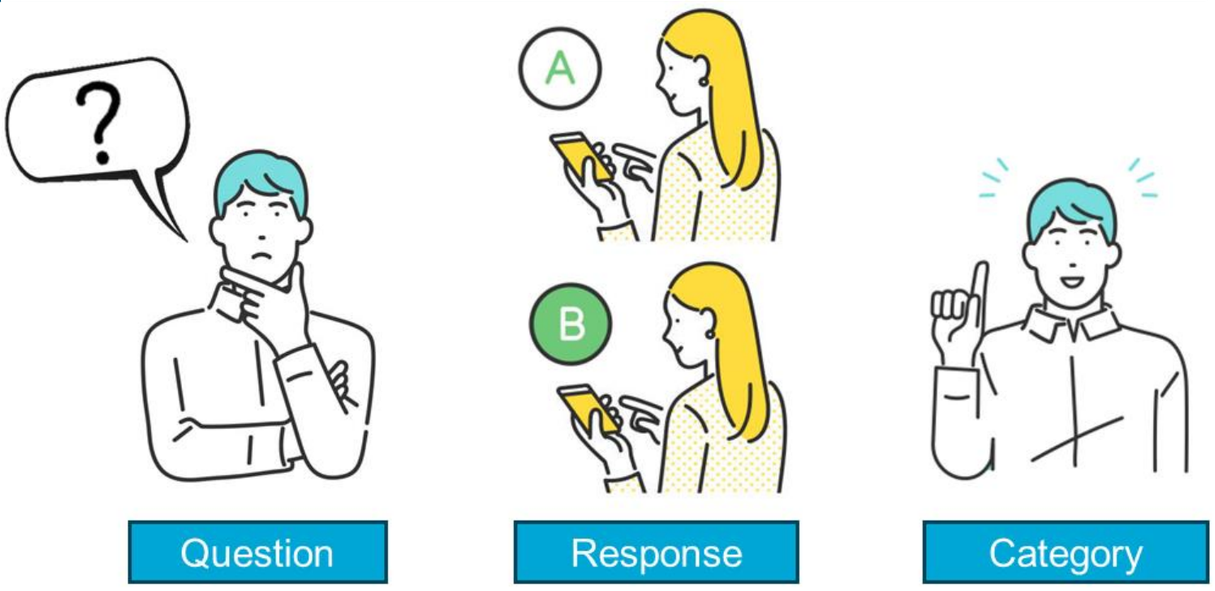
Reduction = **Mitigation** + **Prevention**

Mitigation → ***Minimize*** *subsidence and its impacts*

Prevention → ***Avoid*** *subsidence and its impacts*

Technical measures | *Non -Technical measures*

3. Method

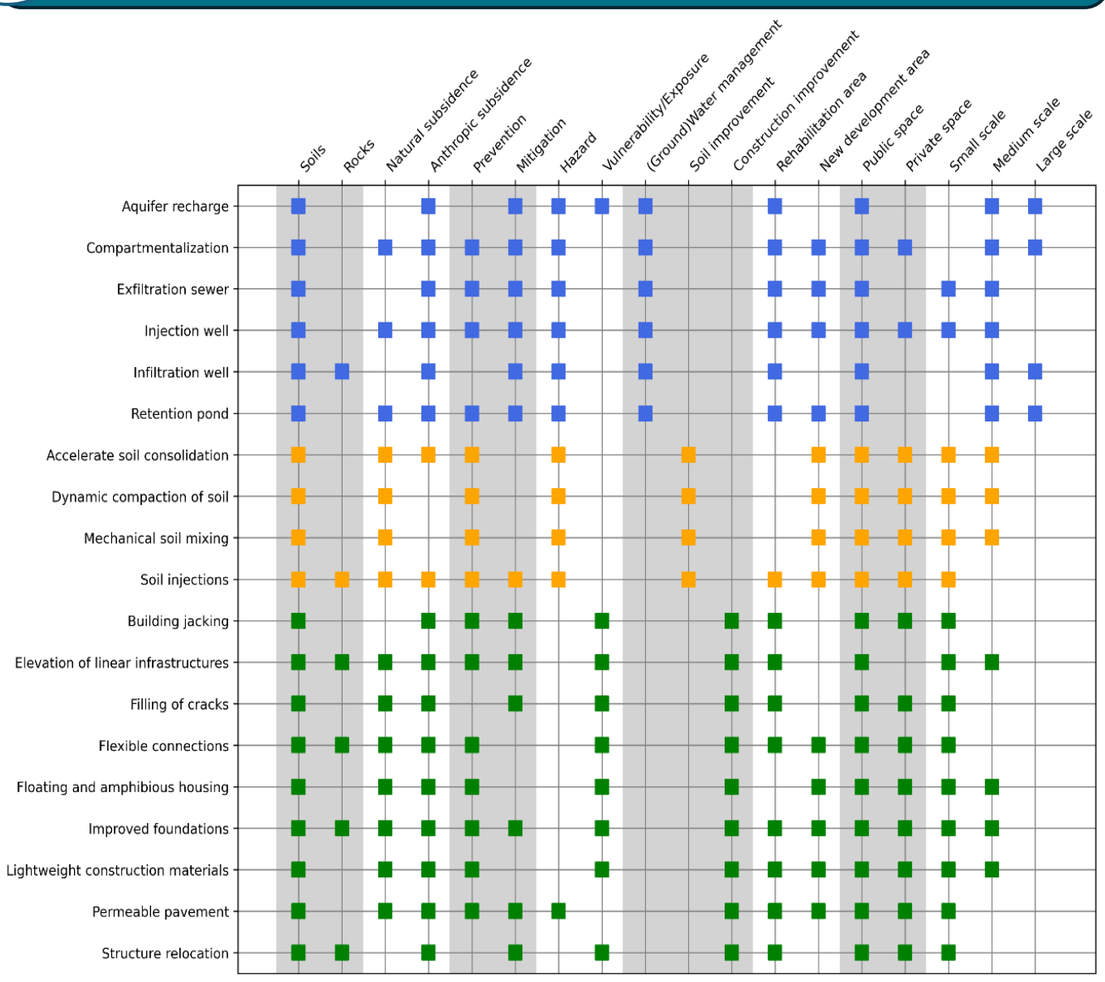


What is the geology?
What is the primary cause of subsidence?
What is the objective of the intervention?
What needs to be mitigated or prevented?
What type of action is foreseen?
What type of urban area?
Where is the measure applied?
How big is the area of application?

Effectiveness =

- *(1) Reduced subsidence or damage*
- *(2) Maintenance*
- *(3) Negative side effects*
- *(4) Durability*

4. Application



	Technical measure	(1)	(2)	(3)	(4)
Ground-water Management	**Injection well**	10 - 50%	Minor	Many	Long
Soil Intervention	**Accelerate soil consolidation**	> 50%	No	Many	Long
Interventions on buildings or roads	**Foundation strengthening**	> 50%	No	Few	Long

5. Conclusions

The proposed framework is designed for stakeholders and decision makers. It helps selecting technical measures to mitigate and prevent subsidence and its impacts in urban areas based on their suitability in certain areas and their effectiveness.
This approach was tested in two pilot areas, and it successfully identified the set of technical measures adopted in each case. Refinements and further validation are needed for this method to be fully integrated in subsidence management policies.

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References

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