

Comfort, health and energy-use behavior for homeostasis in informal settlements

Investigating sustainability of the slum rehabilitation process in Mumbai using backcasting approach

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Overview

Broad scope of this study:



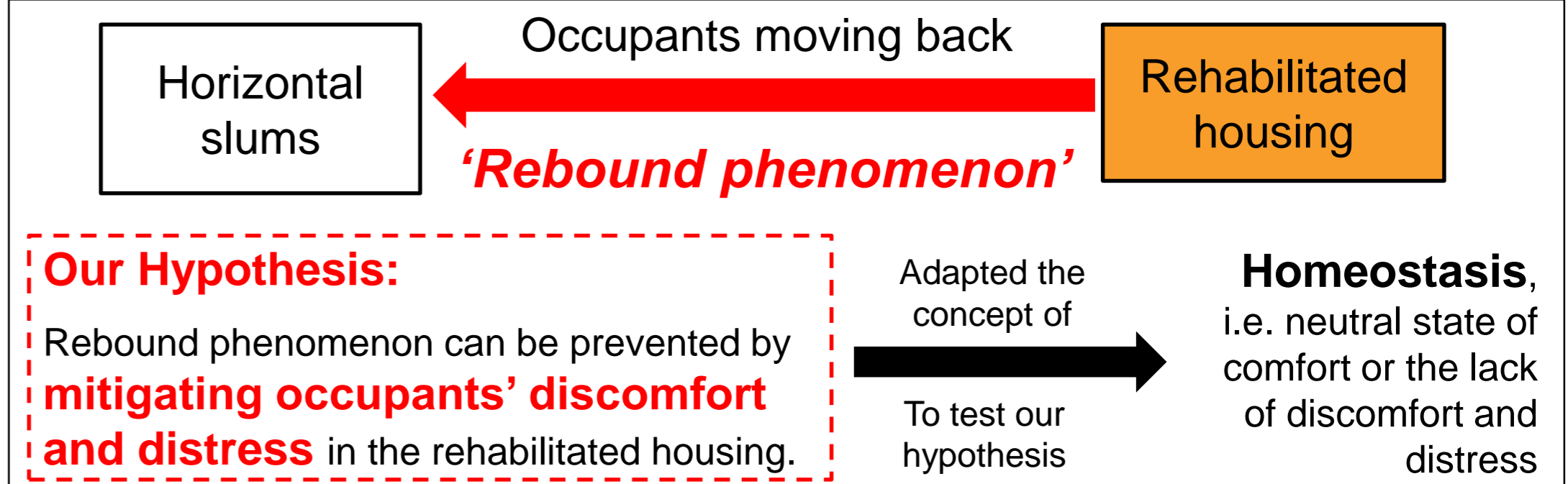
SDG 11: TARGET 11.1

By 2030, ensure access for all to adequate, safe and affordable housing and basic services.

- India's commitment towards SDG 11 → **Housing for All 2022** scheme
- In Mumbai, more than 50% of the 18.41 million people lives in informal settlements like slums.
- Government is addressing this problem through **Slum Rehabilitation Authority** by providing **free housing** to the slum dwellers, called **Slum Rehabilitation Housing**.



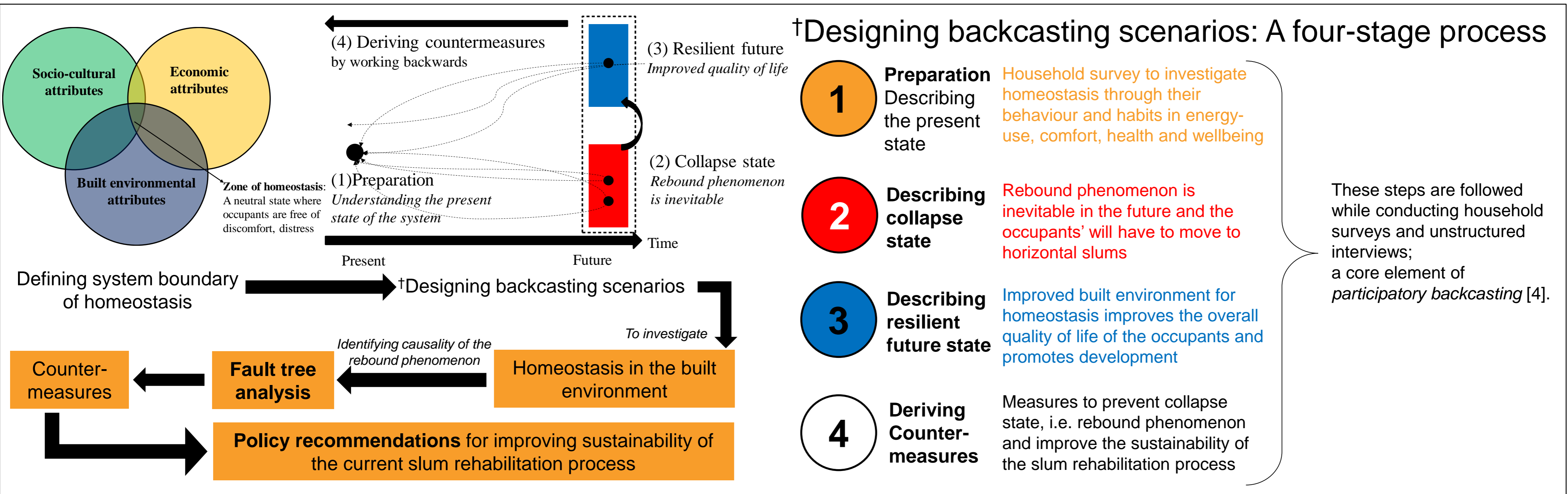
Problem statement and research questions



Research questions:

1. What causes distress or discomfort (i.e. *loss of homeostasis*) in slum rehabilitation housing ?
2. What could be the countermeasures to prevent loss of homeostasis, and reduce this rebound phenomenon to improve the sustainability of the rehabilitation process?

Methodology: Backcasting to investigate the cause of rebound phenomenon



Survey design

Results: Cause of distress

Economic distress	Indoor environmental distress	Social and architectural distress	Status of well-being (Scored out of 10)
Expensive household appliance ownership on moving from horizontal slums, can be an effect of aspirational buying.	Poor indoor air quality, (~60%)	Social isolation (~70%)	Satisfied with household duties and responsibilities (Mean = 7.5/10; Mode = 10/10)
Higher electricity bills by at least 40%, due to higher appliance ownership that leads to economic distress	Stuffy and mouldy indoors (~80%)	Poor aesthetics (~60%)	Satisfied with general health but higher occurrence of chronic respiratory diseases (Mean = 7/10; Mode = 8/10)
	Lack of daylight (~80%)	Lack of safety and privacy (~60%)	Sad, angry and lonely (Mean = 5/10; Mode = 6/10)
	Lots of insects (~80%)	Lack of personal outdoor space (~80%)	Lack of focus at work (Mean = 4/10; Mode = 0/10)
	Thermally uncomfortable (~10%)	Too noisy (~30%)	

Initial conclusion

- Lack of social and community spaces in the current rehabilitation housing design leads to social isolation and loneliness. It affect the well-being of the occupants.
- Distress due to the poor built environment contributes significantly to the rebound phenomenon.

Work in progress

- Performing fault tree analysis on the survey results.
- Deriving counter measures based on the fault tree analysis and converting it to policy recommendations for the Slum Rehabilitation Authority.

References

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