CLIMATE CHANGE AND VECTOR BORNE DISEASES: A CASE STUDY FROM NEPAL

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Background

- Proposed ADB loan ($200m) to Nepal in 2023 for the Integrated Water Supply and Sewerage Project (IWSSMP) covering secondary & small towns
- Anecdotal information on rising rates of VBD in Nepal and links between VBD and WASH
- Interested to explore strengthening CC resilience in the project design, increasing CC financing and improving quantification of project's economic benefits
- ADB commissioned Deltares (Netherlands) to explore links between CC, VBD and WASH supported by ADB Water Sector Group's Cluster TA *Mainstreaming Water Resilience in Asia and the Pacific*
- Study focused on 2 proposed project towns – Itahari and Damak

Methodology

- SSP2-4.5 is a “middle of the road” scenario
- SSP5-8.5 is a “fossil-fueled” high-growth scenario with limited progress on mitigation

- Quantitative relations from literature:
  - 3 studies on climate change and VBDs in Nepal
  - 3 studies on WASH and VBDs in India and Thailand
- Assumptions (1): Climate variables from IPCC 5th assessment report (AR5) for Nepal

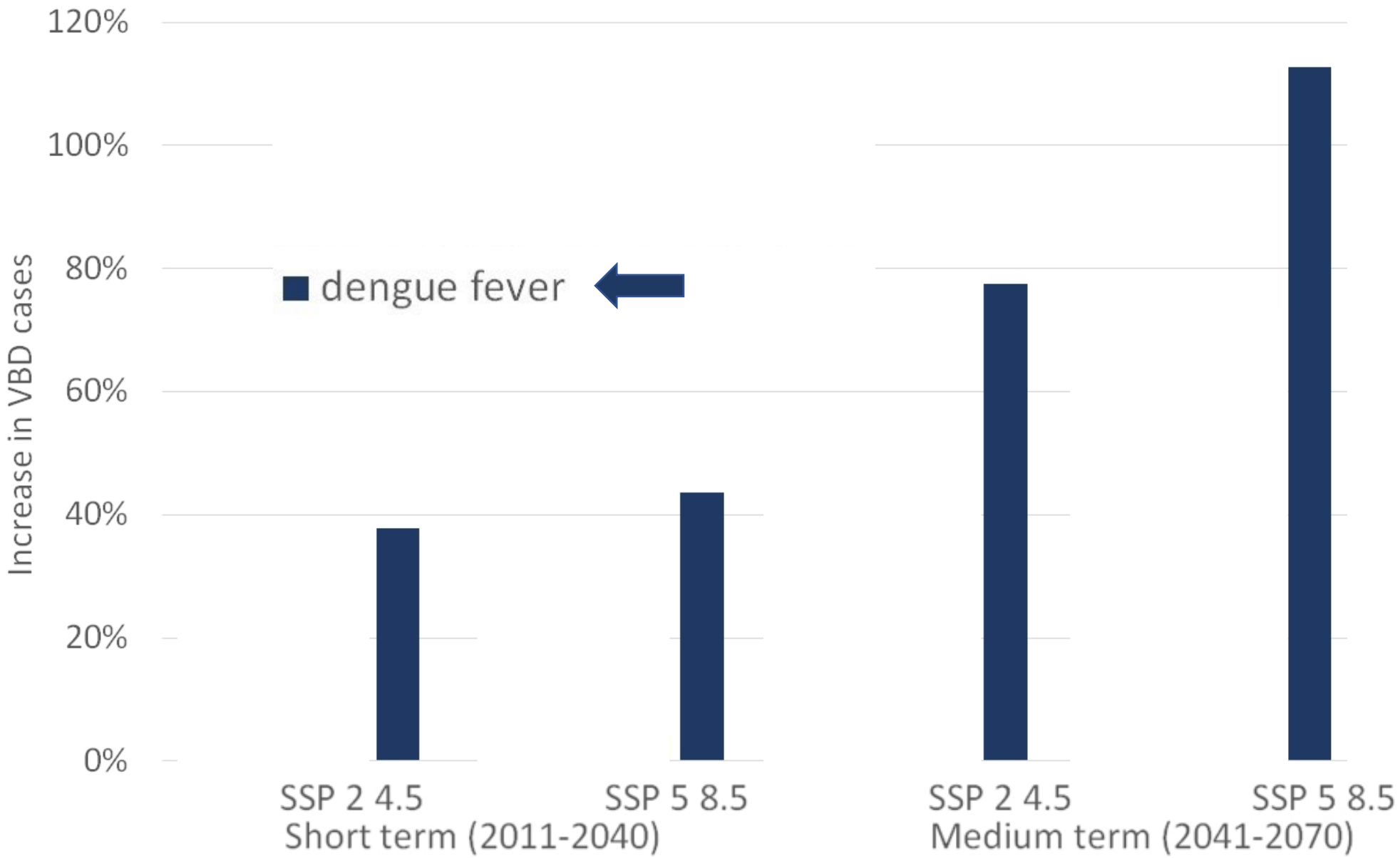
AR5 Nepal	Short term 2016-2045		Medium term 2036-2065	
	RCP4.5	RCP8.5	RCP4.5	RCP8.5
Mean temperature	+0.92°C	+1.07°C	+1.3°C	+1.8°C
Annual precipitation	+2.1%	+6.4%	+7.9%	+12.1%

- Assumptions (2): Changes in WASH service levels to population through IWSSMP

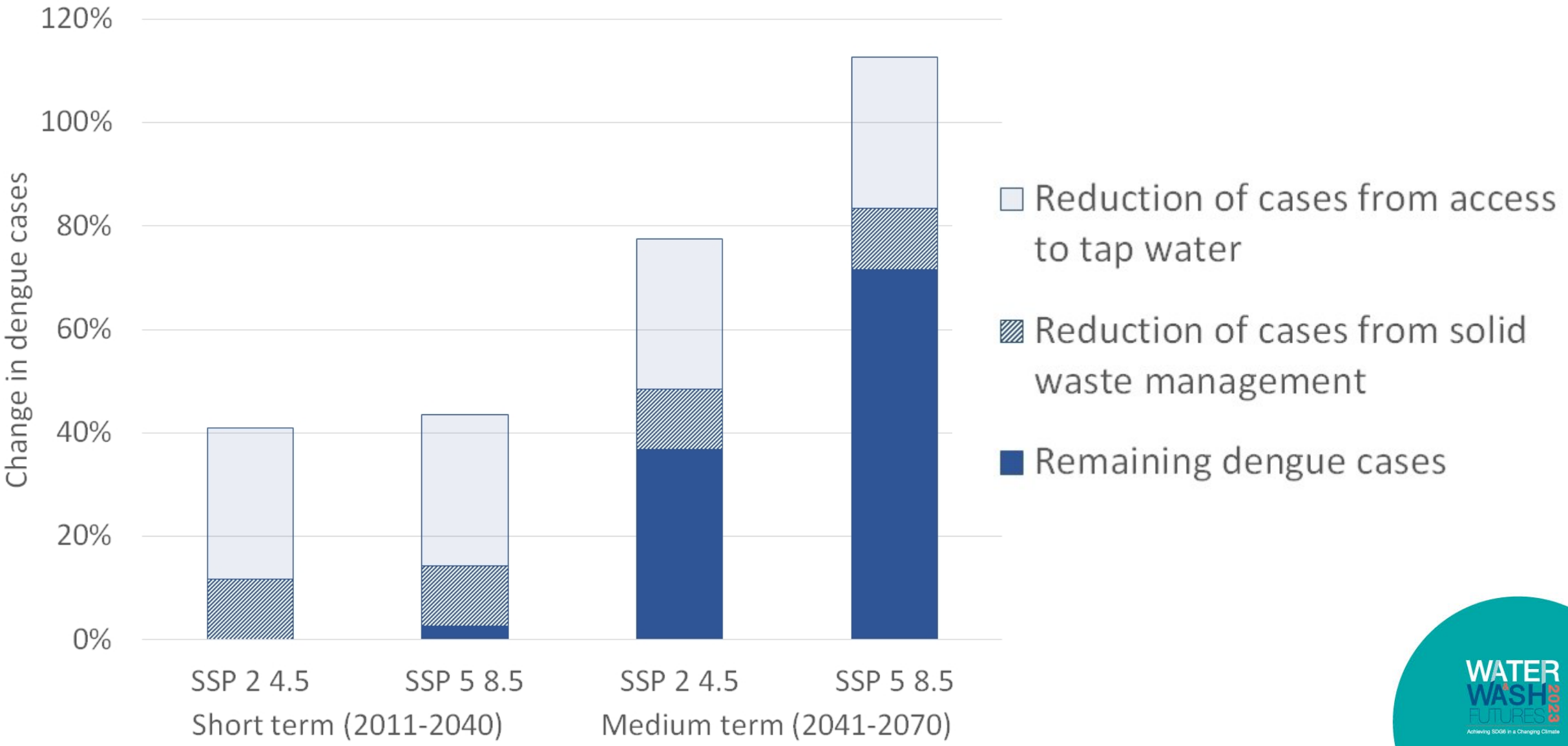
Indicator	2020 (JMP, urban)	Target	Change
Piped (tap) water at household level	53%	90%	+37%
Pour-flush latrine, septic tank/sewer	78%	98%	+20%
Safe solid waste management at household level			+30%

→ Calculations

Maximum increases in 4 VBDs in Nepal under 2 climate scenarios



How water and improved SWM could compensate for CC-induced increases in dengue

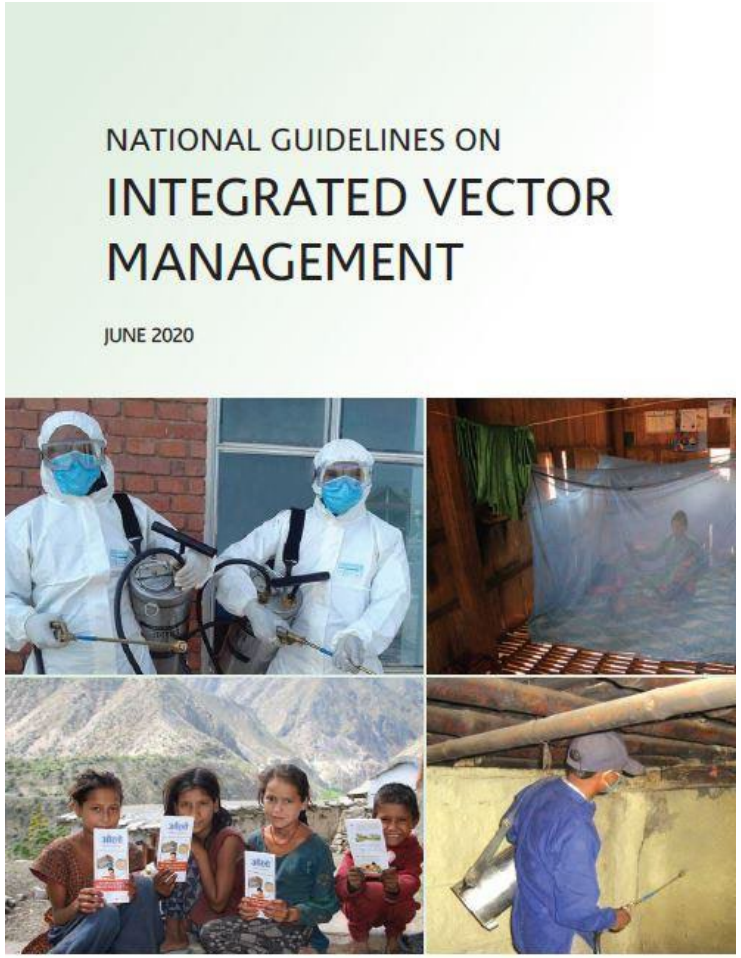


VBD and water demand

- Example: Itahari town, population 198 098 (2021)
  - Incidence 745/million (based on outbreak 2019)
  - 9 days ill, 1/20 in hospital 5 days
- Outbreak
  - 148 cases
  - 1328 ill days (from 65 to 100 lpcd)
  - 37 hospital days (from 65 to 150 lpcd)
- One outbreak = 49,625 litres extra water demand
- Outbreaks more likely with climate change

Recommendations for consideration in project design

- Prevent vector-breeding
- Safe water storage
- Solid waste disposal and management of household environment
- Capacity building
- Awareness raising
- Inter-sector collaboration, particularly with Epidemiology and Disease Control Division (Dept of Health Services)



Key Points

- CC could increase VBD risk in Nepal, particularly dengue
- Water supply may reduce VBD risk (less water storage)
- Solid waste mgt at HH level can reduce mosquito breeding
- Together, investments in water supply and waste management can compensate for CC–effects on VBD risk

Limitations:

- Quantitative VBD relations from 6 references
- Disease risk ≠ disease
- Gradual increases ≠ outbreaks
- Many uncertainties

Improve water supply, sanitation, and solid waste management to strengthen resilience to vector-borne diseases.

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Thank You

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Achieving SDG6 in a Changing Climate