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Beyond Local Context: Decision-Support Information Gap Coincides with Bottlenecks in Flood Early Warning

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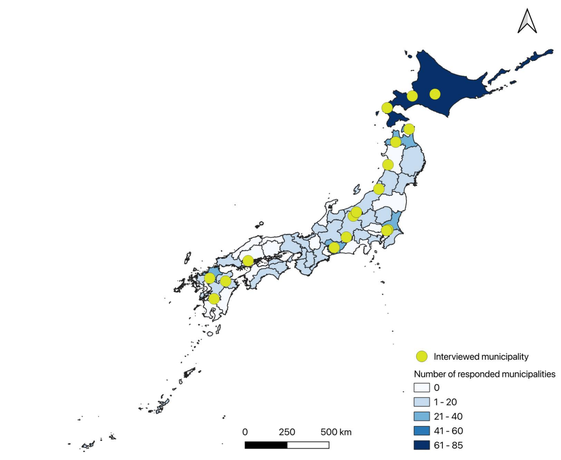
KEY TAKEAWAY:

Flood Early Warning System (FEWS) coverage is an incomplete indicator of decision readiness.

Information systems need to be designed around specific decisions municipalities struggle to make under uncertainty.

NATIONAL MIXED-METHOD STUDY



Exploratory sequential design

20 in-depth interviews

45 officials

16 municipalities + 4 prefectures

504 municipal responses

approximately 29% of 1,741 municipalities

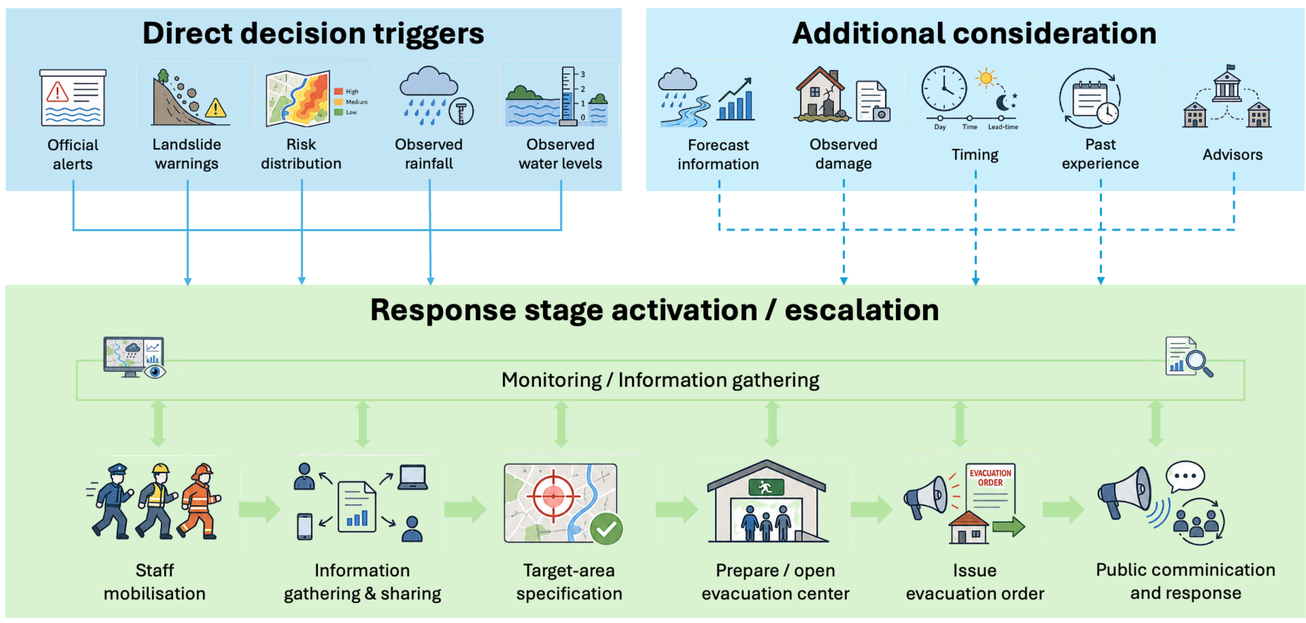
Interview findings informed the nationwide survey and 15 information items.

DECISION-SUPPORT INFORMATION GAP

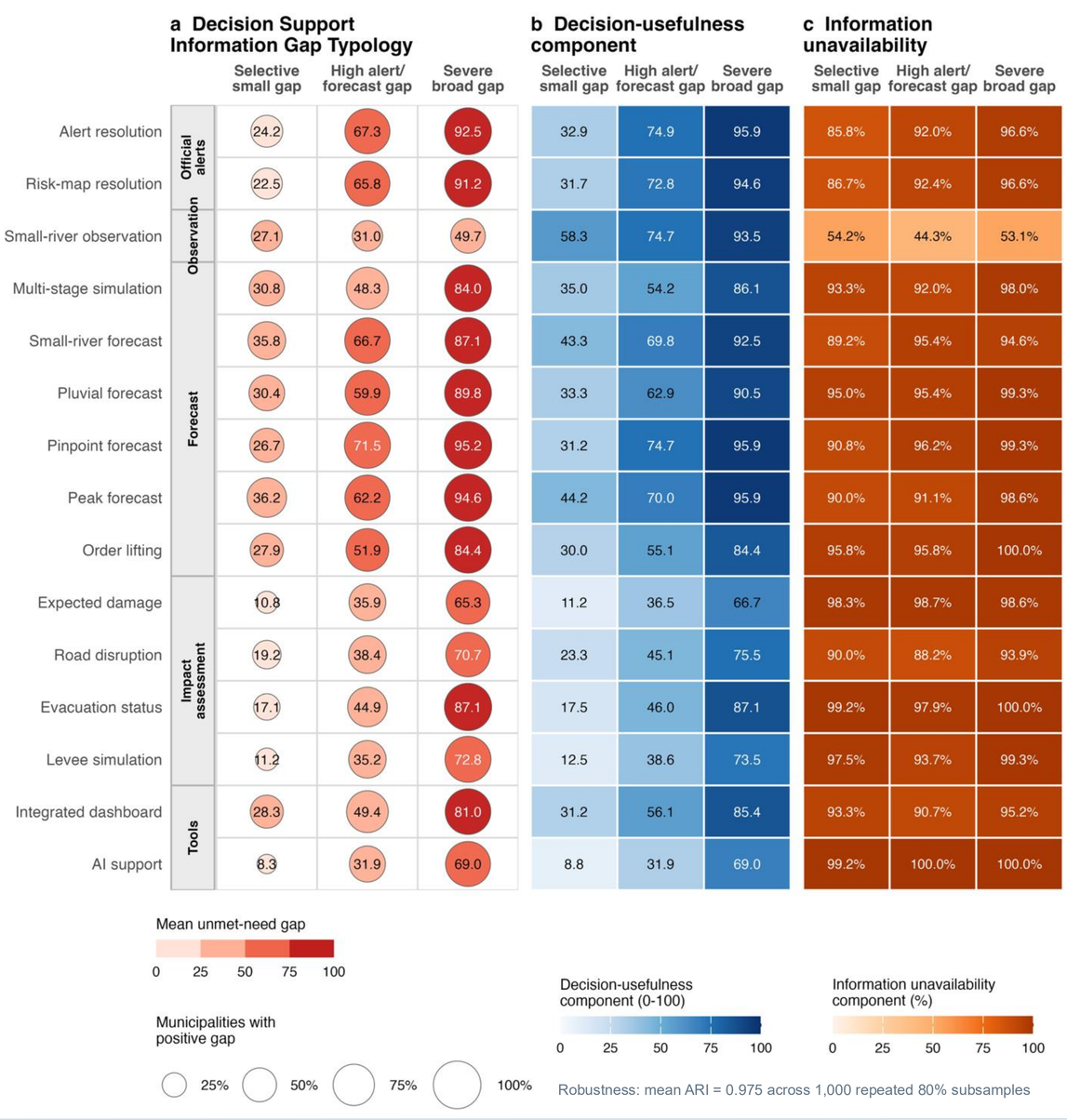
The mismatch between information considered useful for protective decisions and its reported availability to decisionmakers.

A positive gap indicates useful but unavailable information.

DECISIONS ARE ANCHORED IN OFFICIAL WARNINGS
FORECASTS SUPPORT ANTICIPATION, AREA SPECIFICATION, ESCALATION



THREE PROFILES OF DECISION-SUPPORT INFORMATION GAPS



UNEVEN DECISION READINESS WITHIN A COMON NATIONAL FEWS ARCHITECTURE

1 Selective small gap

n = 120 | mean gap = 26.7

Relatively smaller and more selective gaps; unmet needs concentrate in forecast information. Smaller gaps partly reflect lower perceived usefulness - not uniformly greater availability or readiness.

Interpretation: a selective mismatch, not uniformly high information availability.

2 High alert/forecast gap

n = 237 | mean gap = 50.0

The principal mismatch lies upstream in obtaining sufficiently localized and anticipatory hazard information; gaps for several impact-assessment products and decision-support tools are smaller.

Need: more localized alerts; small river forecasts, inland flood forecasts, pinpoint and peak forecasts; clearer guidance linking forecasts to preparatory actions and target-area decisions.

3 Severe broad gap

n = 147 | mean gap = 80.0

Large gaps extend across nearly all information domains - from alerts and forecasts to impact assessment, decision-support tools, evacuation management and lifting orders.

Need: broad combination of warning improvements, impact information, information integration, interpretation and institutional support.

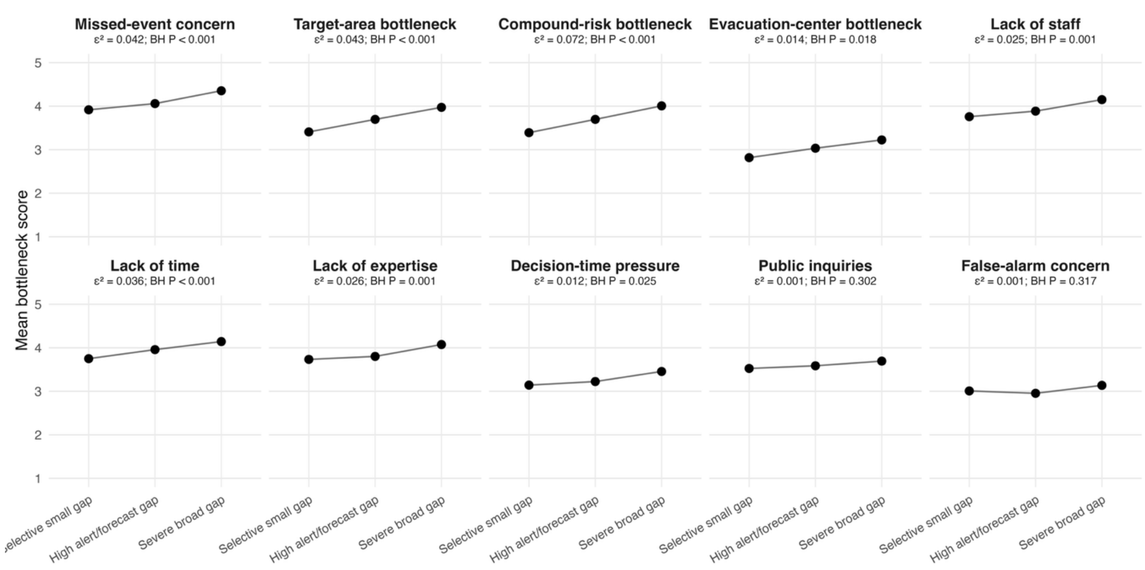
WHY THE TYPOLOGY MATTERS

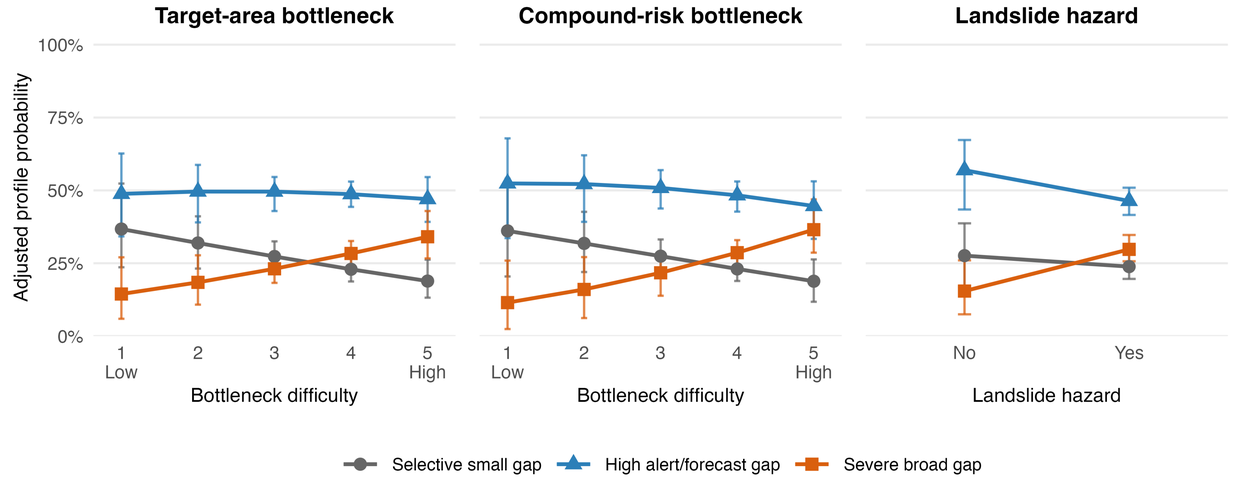
The profiles were not classifications of observable characteristics: river context, previous flood damage experience and hazard type showed limited differentiation.

A uniform improvement in forecast accuracy or information volume is unlikely to address all unmet needs.

Closing the gap requires the alignment between FEWS information and the institutional decisions that convert warning into protective action.

SEVERE INFORMATION GAPS COINCIDE WITH BOTTLENECKS





14.2%

variance explained

adjusted R^2 = 0.092

Target-area specification (β = 3.23) and compound-risk bottlenecks (β = 3.13) were associated with larger overall gaps.

Population, expenditure, river group and historical flood damage showed no clear independent association.

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