

Adoption of climate-smart agricultural practices among smallholder farmers in northern Thailand: The role of socioeconomic and institutional factors

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1 Introduction

- Climate change threatens agricultural production globally (Omotoso & Omotayo, 2026).
- Climate impacts on crops are mostly felt in developing countries (Moore & Niles, 2024).
- Adaptation is critical to building resilience and sustaining food production (Madaki et al., 2023)

AIM OF THE STUDY

Identify the climate change adaptation practices among smallholders and examine the socioeconomic and institutional factors behind those adoption decisions.

2 Methodology

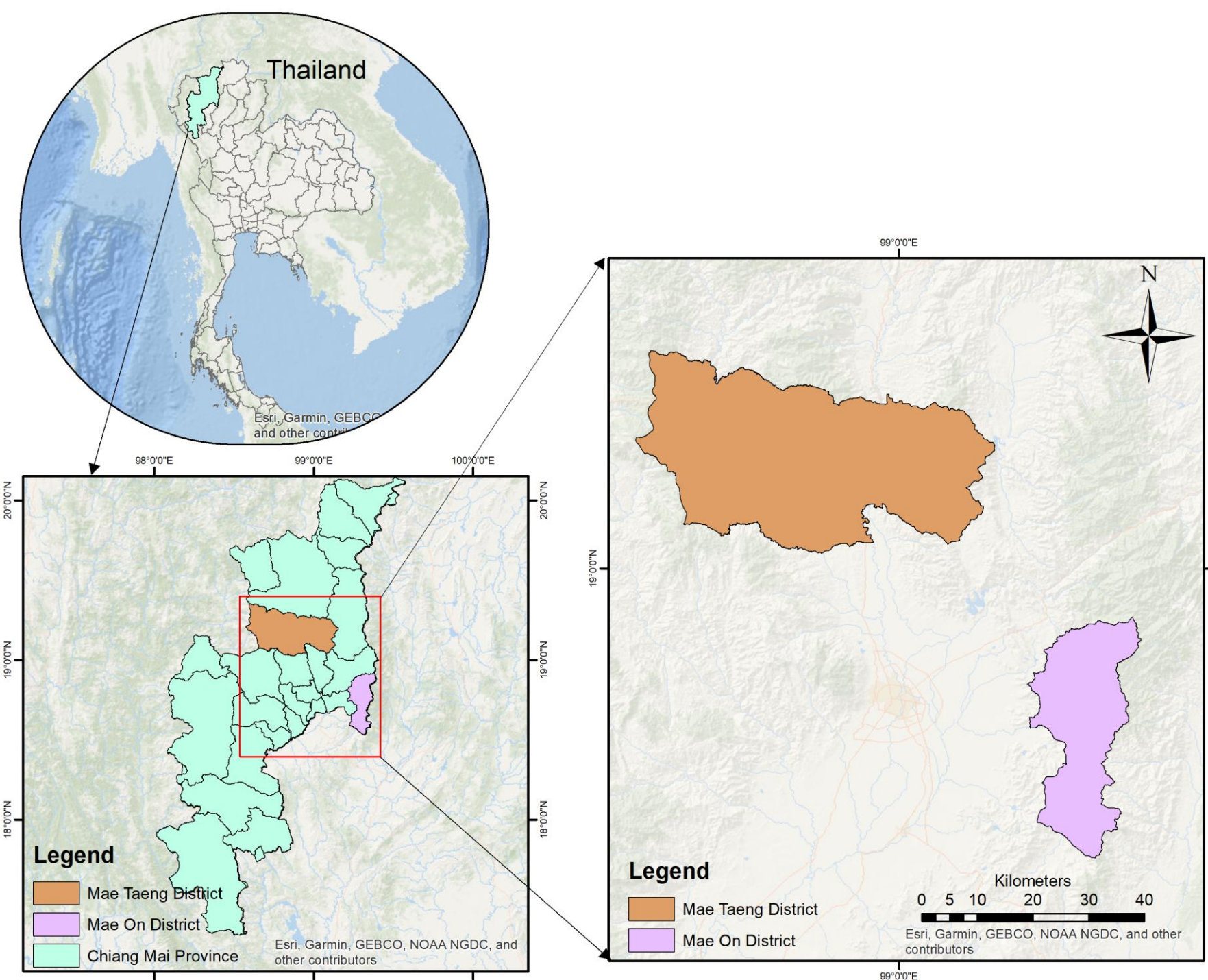


Fig. 1 Study area: Mae Taeng and Mae On districts, Chiang Mai Province.

Mixed methods

198 farm household surveys · 3 key informant interviews · 2 focus group discussions

Weighted Average Index (WAI)

Ranks how widely each adaptation practice is used

Problem Confrontation Index (PCI)

Ranks the severity of the constraints farmers face

Binary logistic regression

Tests which farmer and institutional attributes predict adoption

3 Results & Discussion: Household profile

58%

are over 50 years old

56%

schooled to primary level only

43%

rely on informal credit only

52%

farm less than 0.5 ha

58.6%

Inorganic farmers

33%

receive no climate information



Surveyed household, Mae Taeng district

4 Results & Discussion: Impacts on crops

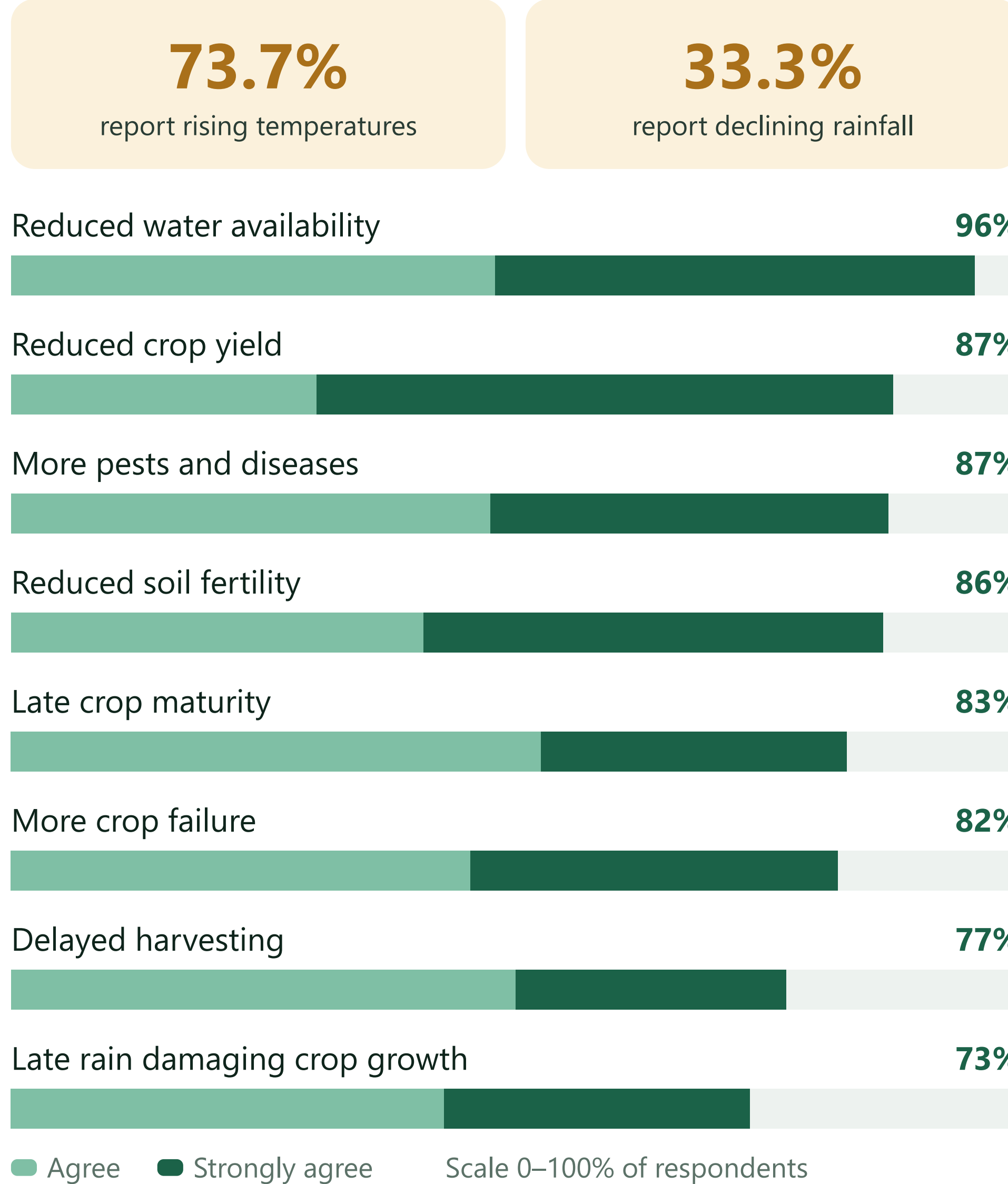


Fig. 2 Perceived impacts of climate change on crop production (n = 198). Water is the binding physical limit: 96% see it shrinking.



Household questionnaire survey

key informant interviews with organic farmers' cooperative

5 Results & Discussion: Adaptation practices

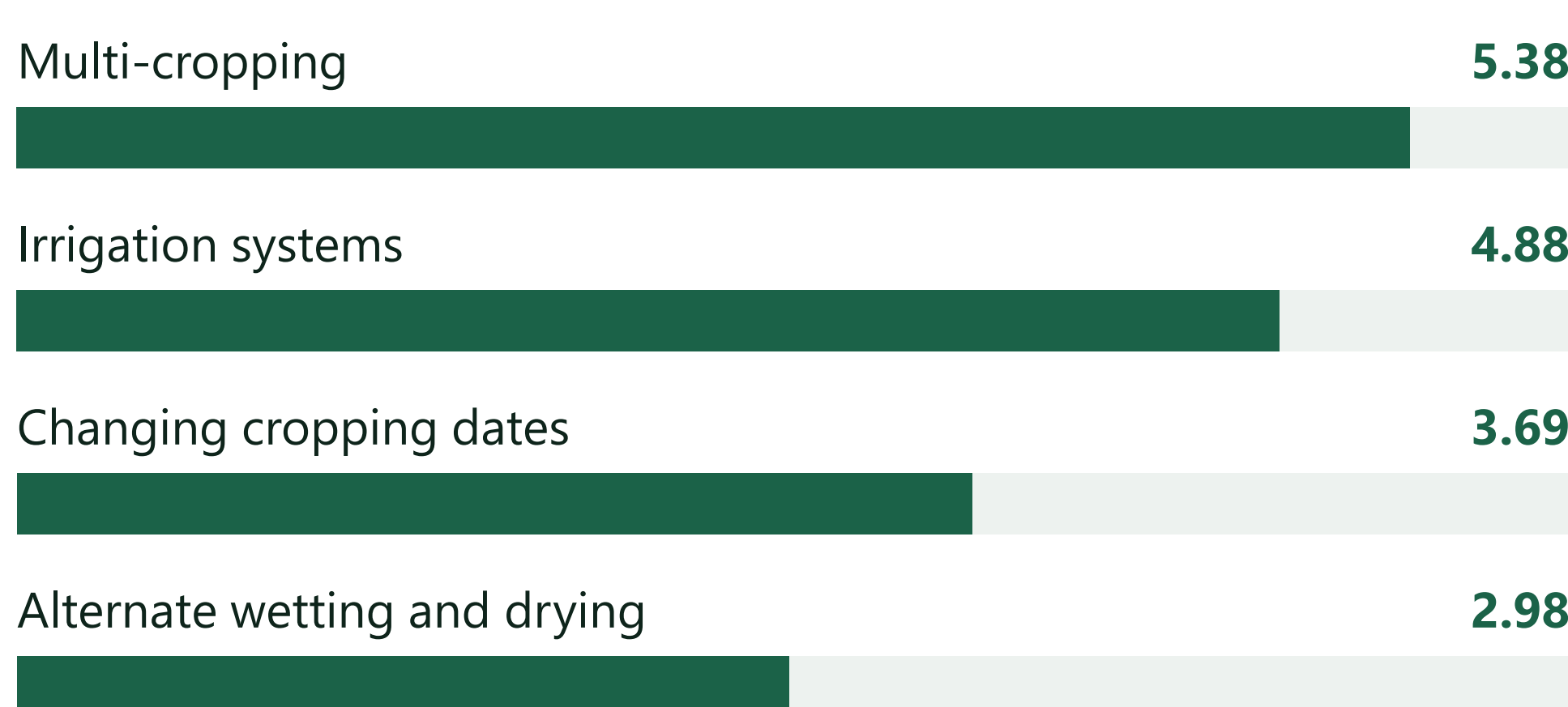


Fig. 3 Most widely adopted adaptation practices computed with WAI.



Multi-cropped vegetable beds under hand irrigation

Rice harvest, Chiang Mai lowlands

6 Results & Discussion: Adoption determinants

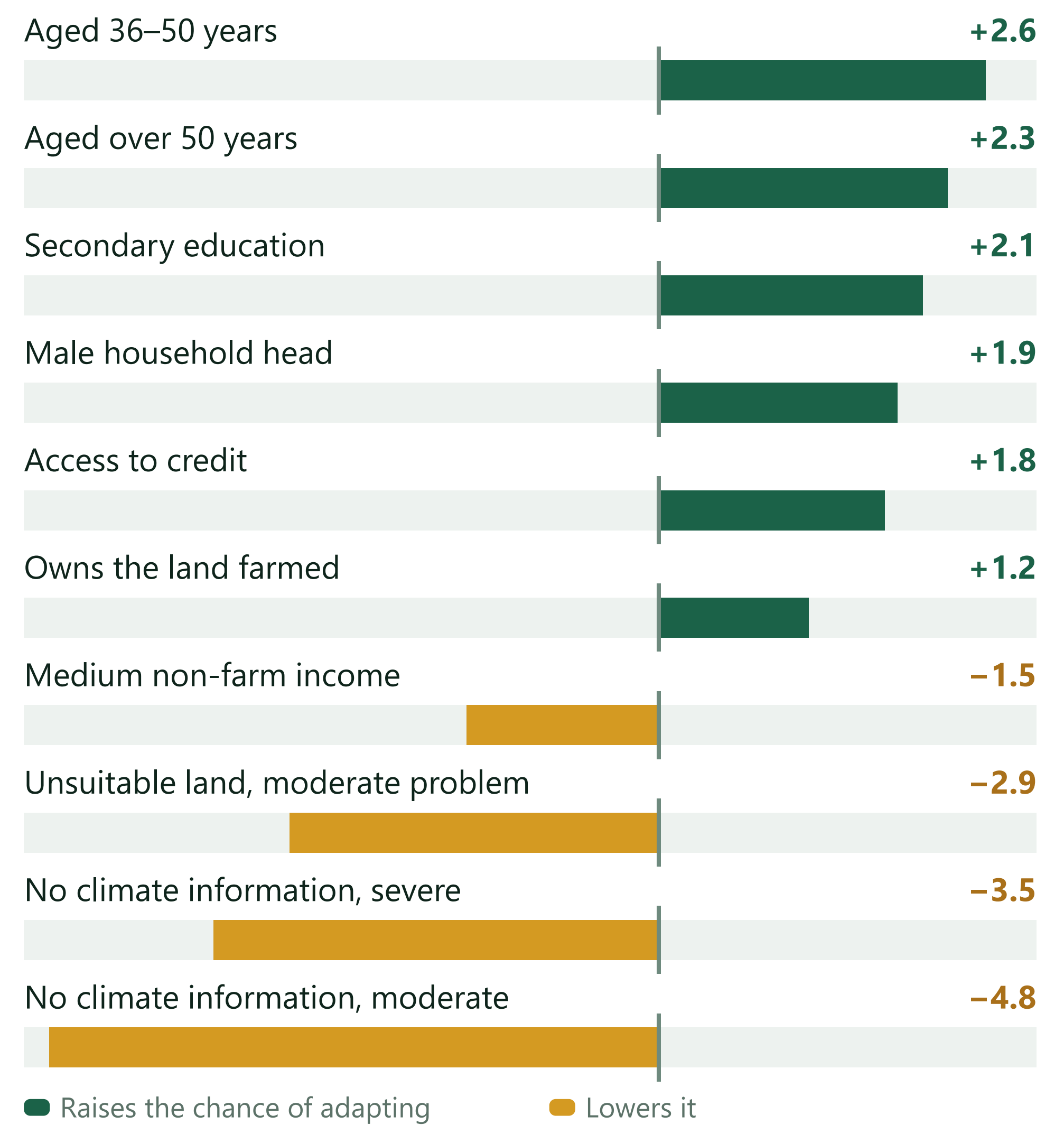


Fig. 4 Marginal effects from the binary logistic model, in percentage points of adoption probability (scale -5 to +3). Only effects significant at $p < 0.05$ are shown, each relative to its reference category. Extension contact and farm income were not significant.

7 Results & Discussion: Adoption constraints

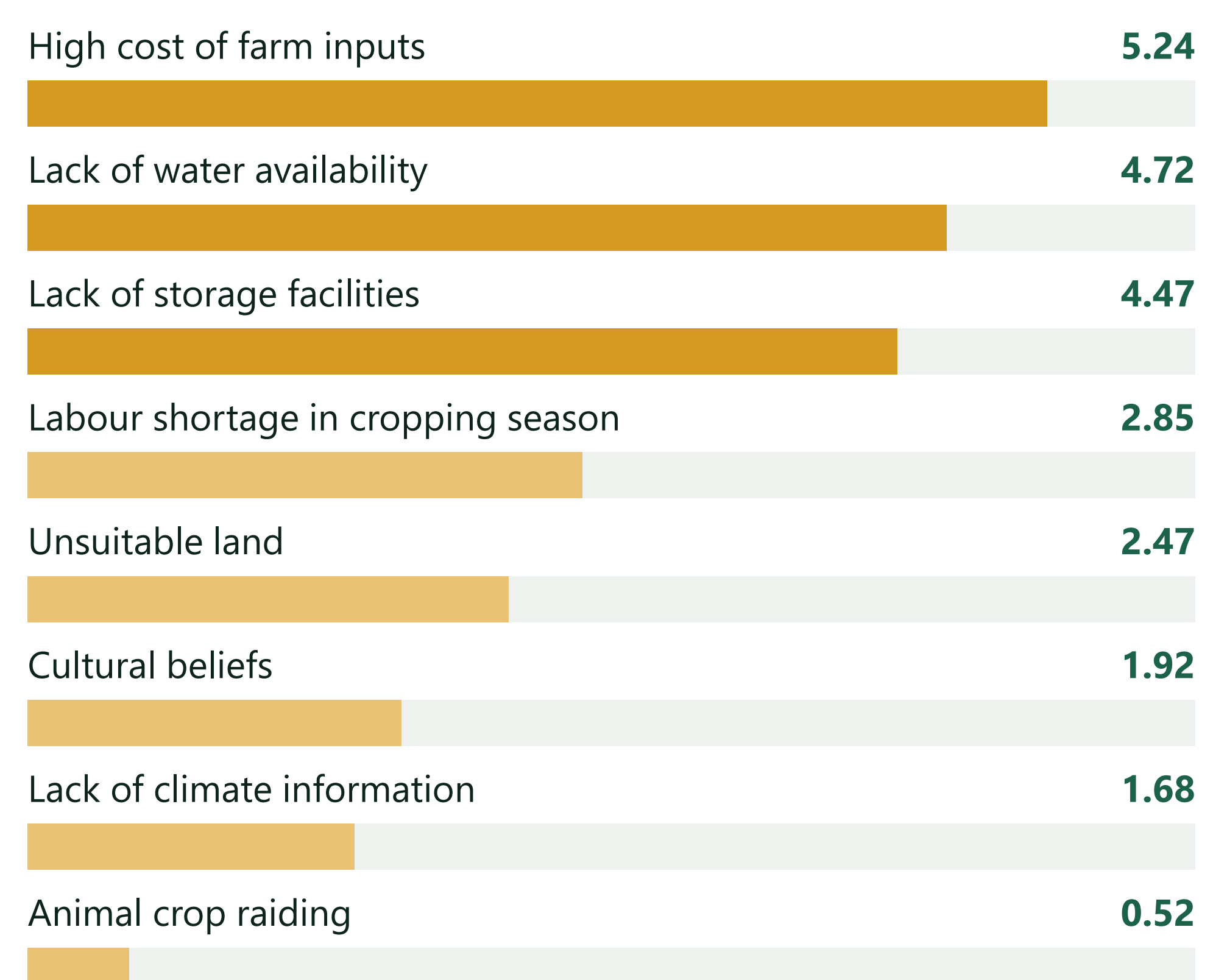


Fig. 5 PCI ranking of constraints to adaptation.

8 Conclusions

- Farmers adapt through crop diversification and water management.
- Adoption is socially patterned: older, male-headed, educated, land-owning households with credit adapt most.
- Information gap is the strongest brake, a larger effect than any demographic factor.
- Cost, water and storage are key constraints. Willingness is not the bottleneck.

POLICY IMPLICATIONS

- Widen affordable credit and cut the cost of farm inputs
- Scale localised climate information and extension services
- Invest in irrigation and post-harvest storage

References

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KEYWORDS

Resilience · binary logistic regression · climate change adaptation · climate-smart agriculture · Northern Thailand · smallholder farmers

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