



Farmer adaptation and coping of climate variability-induced shocks in Ethiopia: Disentangling household-specific determinants of *ex-ante* and *ex-post* strategy choices

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Background

- Climate variability-induced shocks, mainly drought, pests, crop disease and hailstorm, have been posing formidable policy challenges in Ethiopia for several decades.
- Shocks do not only cause hunger and income deprivation in the moment they occur, but also lead to a loss of farm assets that hamper productivity and income opportunities of the farmer in the long run.
- Smallholder welfare, both in short and long run, depends on their choice of strategies to deal with these shocks before (*ex ante*) and after (*ex post*) their occurrence.
- These choices are farmer-specific due to a strong heterogeneity of farmers' socioeconomic settings (Berhanu and Beyene 2015; Wossen 2018; Caeyers and Dercon 2012; Berger et al. 2017).

Objectives

- To disentangle household-specific determinants of farmers' choice of *ex-ante* adaptation and *ex-post* coping strategies to climate induced shocks &
- To identify complementary and competitive strategies.

Study area & data

- Baseline data from CIMMYT's SIMLESA project in Ethiopia collected in 2011
- 898 farm households from the major maize growing hotspots

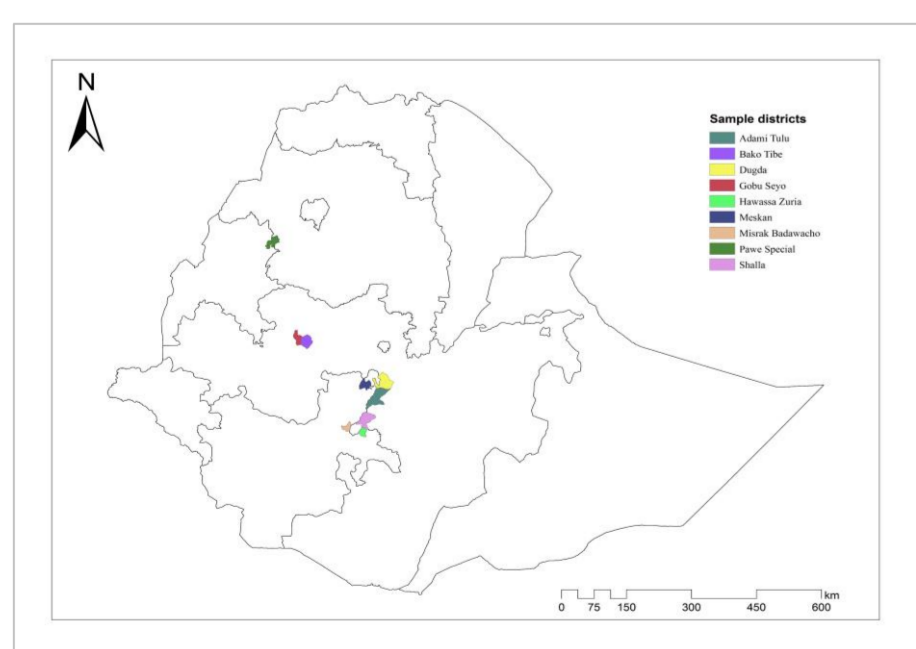


Fig. 1. Sample districts

Methodology

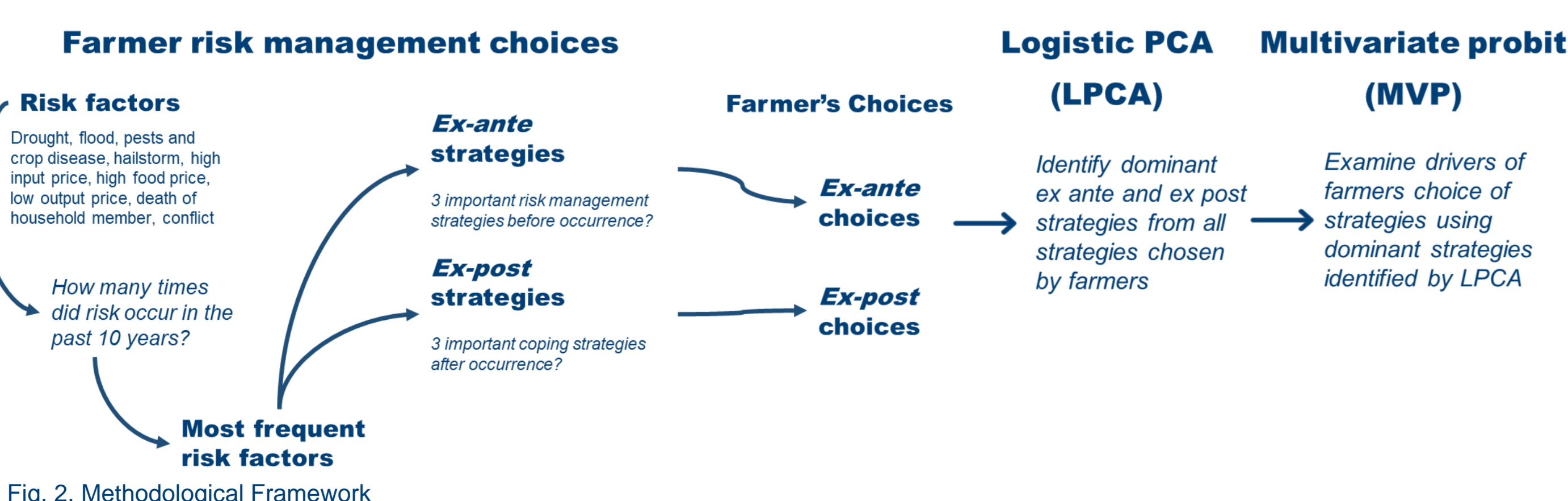


Fig. 2. Methodological Framework

Results

What are dominant *ex ante* and *ex post* strategies?

Which strategies are complementary / competitive?

What are farmer-specific drivers of strategy choices?

Method: Logistic principal component analysis (LPCA)

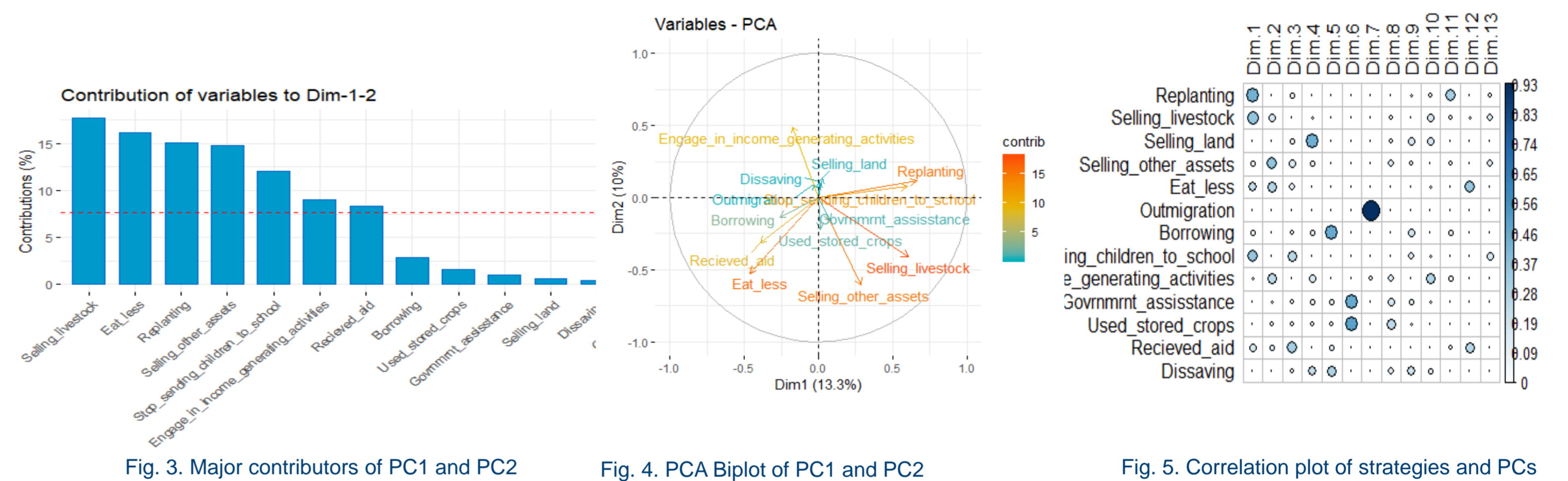


Fig. 3. Major contributors of PC1 and PC2

Fig. 4. PCA Biplot of PC1 and PC2

Fig. 5. Correlation plot of strategies and PCs

Drought		Hailstorm		Pests	
EA	EP	EA	EP	EA	EP
Drought tolerant crops, drought tolerant varieties, early planting, soil and water conservation	Selling livestock, replanting, reducing consumption, selling other assets	Crop diversification, increase seed rate, more non-farm work	Replanting, reduce consumption, selling livestock, borrowing	Pest tolerant varieties, crop diversification	Sell other assets, reduce consumption, sell livestock, replanting

Table 1. Dominant strategies

Method: LPCA and Multivariate probit (MVP)

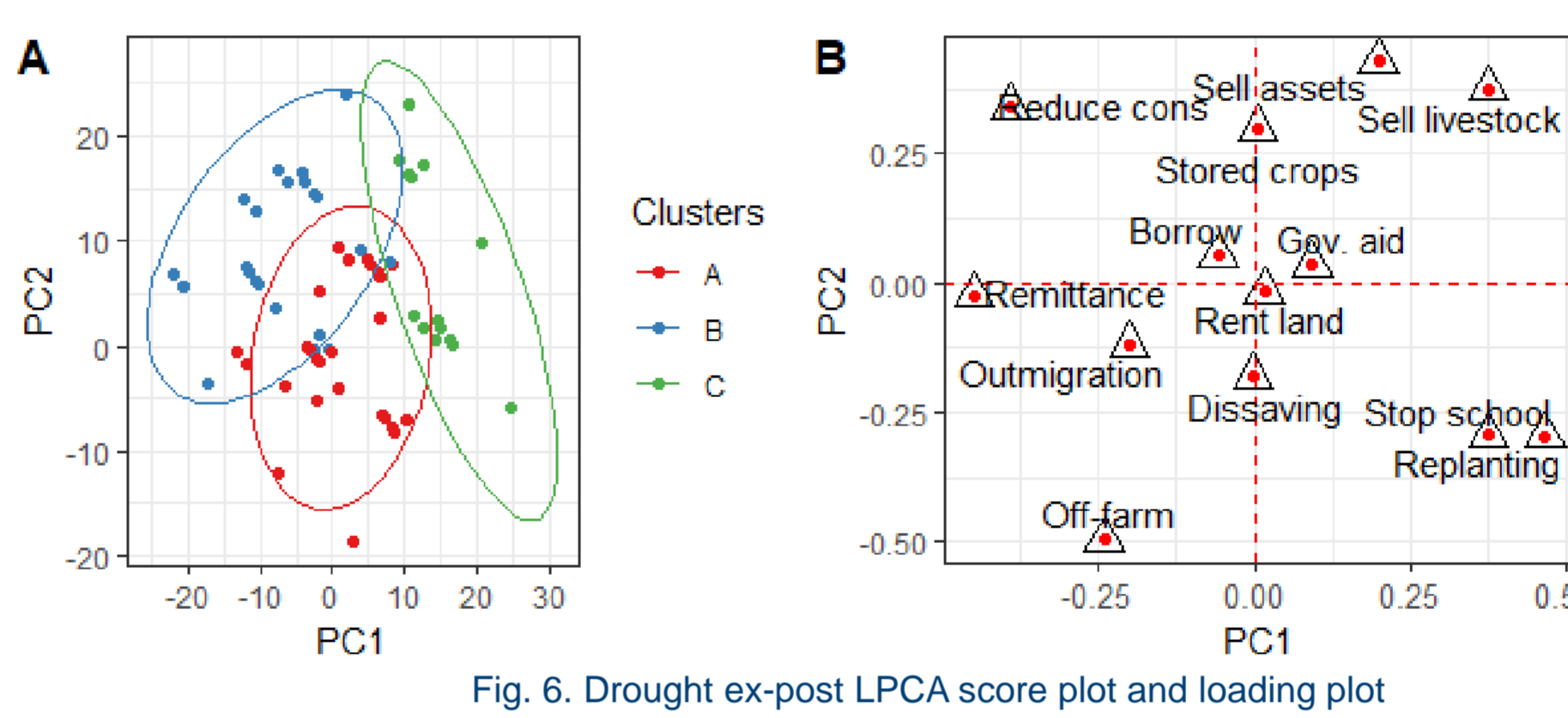


Fig. 6. Drought ex-post LPCA score plot and loading plot

Drought <i>ex-post</i>
Complementary
Selling livestock & selling assets
Selling assets & replanting
Selling livestock & replanting
Competitive
Reducing consumption or selling assets
Reducing consumption or selling livestock

Table 2. MVP result: Correlation between strategies

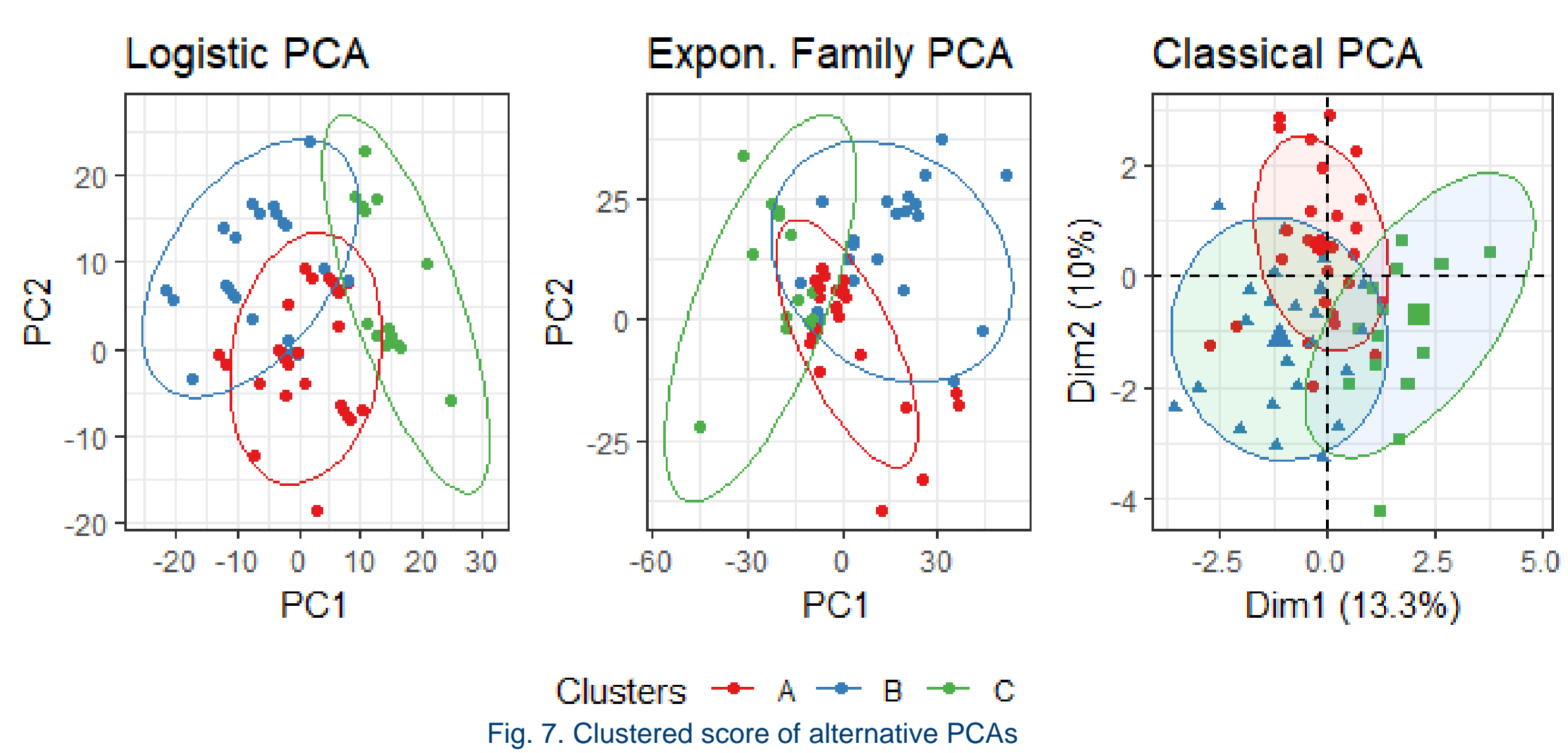


Fig. 7. Clustered score of alternative PCAs

- MVP is consistent with LPCA
- Most strategies are complementary strategies
- Complementarity is strong in both *ex ante* & *ex post*
- Competitiveness is prevalent in *ex post* strategies
- Robustness requires multiple strategies

Method: MVP of interdependent adoption decisions

- Farmers' choice of strategies is highly idiosyncratic and heterogenous.
- Educated and male-headed households are more resilient to climate induced shocks.
- Participation in rural institutions (*iddir*, SACAs, and religious associations) have a significant contribution in farmers' choices of *ex-ante* and *ex-post* strategies.
- Farmers with strong social networks are more resilient.
- Farmers' resource endowments are more important in determining their *ex-post* strategy choices than *ex-ante* strategies
- Farmers with frequent drought experience and high expectations of future droughts tend to reserve their productive assets to save their future and try to live by other less destructive means to escape the short run effect of drought on their livelihood.

Acknowledgement

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