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# Asymmetric facilitation in agroecosystem: Exploring concurrent positive and negative plant interactions

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March 30, 2022

**Abstract**

Facilitation events were mostly reported in two modes of mutual promotion (+/+) and unilateral benefit (+/0) in cultivated plant populations, yet few investigations showed the third mode, i.e. +/-. We investigated the maize-faba bean intercropping system as the third mode which was little documented. Land equivalent ratio in intercropping system was significantly greater than in monocropping one, with faba bean as superior species (+), and maize as inferior species (-). For inferior species, interspecific competition restricted its substance remobilization and seed filling, and caused a relatively low pollen fertilization rate and high kernel abortion rate. This trend resulted from lower soil water availability in maize strip of intercropping system, and lower leaf chlorophyll content and photosynthetic rate in maize. Yield loss of inferior species provided mechanical explanation on the concurrent +/- facilitation. The findings enriched our understandings on asymmetric facilitation and the relationship between plant diversity and productivity in agroecosystems.

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**Running title: Asymmetric facilitation in rainfed farming**

**The type of article: Letters**

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The number of words in abstract: 150; The number of words in the main text: 4915; The number of references: 53. The number of figures: 4; The number of tables: 2.

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