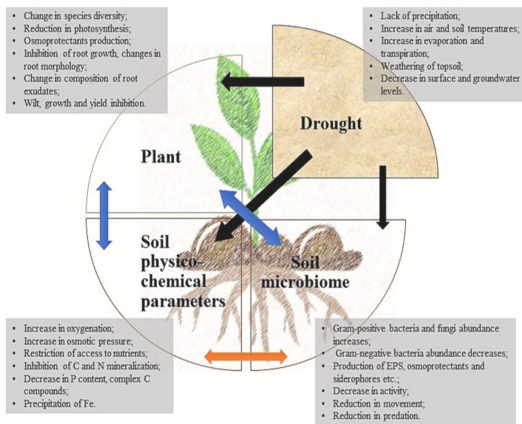




## Common bean- maize facilitation under drought, based on P mobilizing



Furtak, *et al.*, CATENA, 2023.

However, P-mobilizing exudates also 'costs carbon', as root exudation can release up to 20% of carbon fixed by photosynthesis. **There will be a carbon trade-off, especially when quantity and quality of root exudation has changed under drought.** We hypothesize that maize intercropped with legumes can utilize the P mobilized by legumes and then allocate more carbon to growth under drought.

We conducted a root segregation experiment and introduced  $^{14}\text{CO}_2$  and  $^{13}\text{CO}_2$  labelling for maize and common bean, aims to trace rhizosphere interactions and understand intercropping benefits under water deficiency.

**We seek motivated BSc and MSc students to explore rhizosphere facilitation mechanisms of plant-plant interaction under drought stress.**

Examples for MSc and BSc thesis include:

- The carbon allocation in maize-bean intercropping system under drought (BSc thesis)
- P-solubilization rhizosphere interactions between maize and bean in intercropping system under drought (MSc thesis, mainly includes root exudated carboxylates and mol bio)

Required skills: the candidates should have a strong background in biological or soil sciences and be willing to deal with chromatographic datasets and radioactive samples.

In case of interest, please contact Dr. Callum Banfield (5U36) of the Geo-Biosphere Interactions Group at [callum.banfield@uni-tuebingen.de](mailto:callum.banfield@uni-tuebingen.de)

**Drought, worsened by climate change, directly impacts plants and soil, reducing plant photosynthesis and decreasing phosphorus (P) availability.**

**According to stress gradient hypothesis (SGH), intercropped plant species tends to facilitate each other under severe stress.** Particularly, legumes can enhance P acquisition of maize via rhizosphere activities, through release of protons, carboxylates, phosphatases, and phosphate solubilizing bacteria (PSB) recruitment.

However, P-mobilizing exudates also 'costs carbon', as root

