



Coop Research Program | Call 4

## Increasing genetic gain in climbing bean breeding

### Background

Common bean (*Phaseolus vulgaris* L.) is the most important grain legume and protein source for human consumption worldwide and is of particular importance for nutrition and income of smallholder farmers in the tropics. Climbing beans, a distinct subgroup of common beans, are reported to have significantly higher yields, produce more vegetative biomass, and have positive effects on soil fertility as compared to bush types. Despite the many advantages of climbing beans, breeding activities are currently limited.

### Objective

The main objective of this project is the implementation of methods and technologies to increase the genetic gain in climbing bean breeding in order to develop improved varieties. The project aims to develop and implement genomic selection in climbing beans, in combination with techniques for growth cycle acceleration.

### Research Approach

Genomic selection offers opportunities to improve speed and accuracy of the selection process in climbing bean breeding, thereby accelerating the development of improved varieties. In principle, genomic selection allows the prediction of the performance of climbing bean lines for complex traits at early growth stages. In this project, targeted traits will be grain production and grain quality. A training population will be utilized to establish genomic selection models and determine their predictive power. In parallel, methods to accelerate the growth cycle of climbing beans will be developed in the greenhouse. This combination

of approaches will provide information required for adoption of this method into existing breeding programs.

### Relevance and Expected Outcomes

This project aims to accelerate the development of marketable superior climbing bean varieties, which can aid food security and poverty reduction by improving the livelihood of smallholder farmers in a sustainable way. Such improved varieties will further stimulate spreading of climbing bean production in developing countries, which will allow for increased bean production using less land area while aiding soil fertility.

### Food System Challenges Addressed

Sustainable intensification, Sustainable protein production, Diversity in food systems, Effective food value chains.

[www.worldfoodsystem.ethz.ch/research/research-programs/CRP](http://www.worldfoodsystem.ethz.ch/research/research-programs/CRP)

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**Project Duration** 2018-2020

**Project Cost** 350'000 CHF

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