



UNIVERSITÄT
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Maize and climbing beans: more protein, yield and biodiversity

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Maize & beans – partners for over 2000 years world wide



Austria



Peru



Germany



Maize & beans: Why ?

Maize – Climbing beans mixtures:

- High biomass yield (up to 100% relative to maize silage)
- Higher protein content (up to 30% more relative to maize silage)
- No extra technology needed (maize-sowing/harvesting technology)
- More biodiversity (insects, birds)
- Nitrogen fixation/recycling (depending on soil-N status)
- Better soil coverage (less soil erosion)

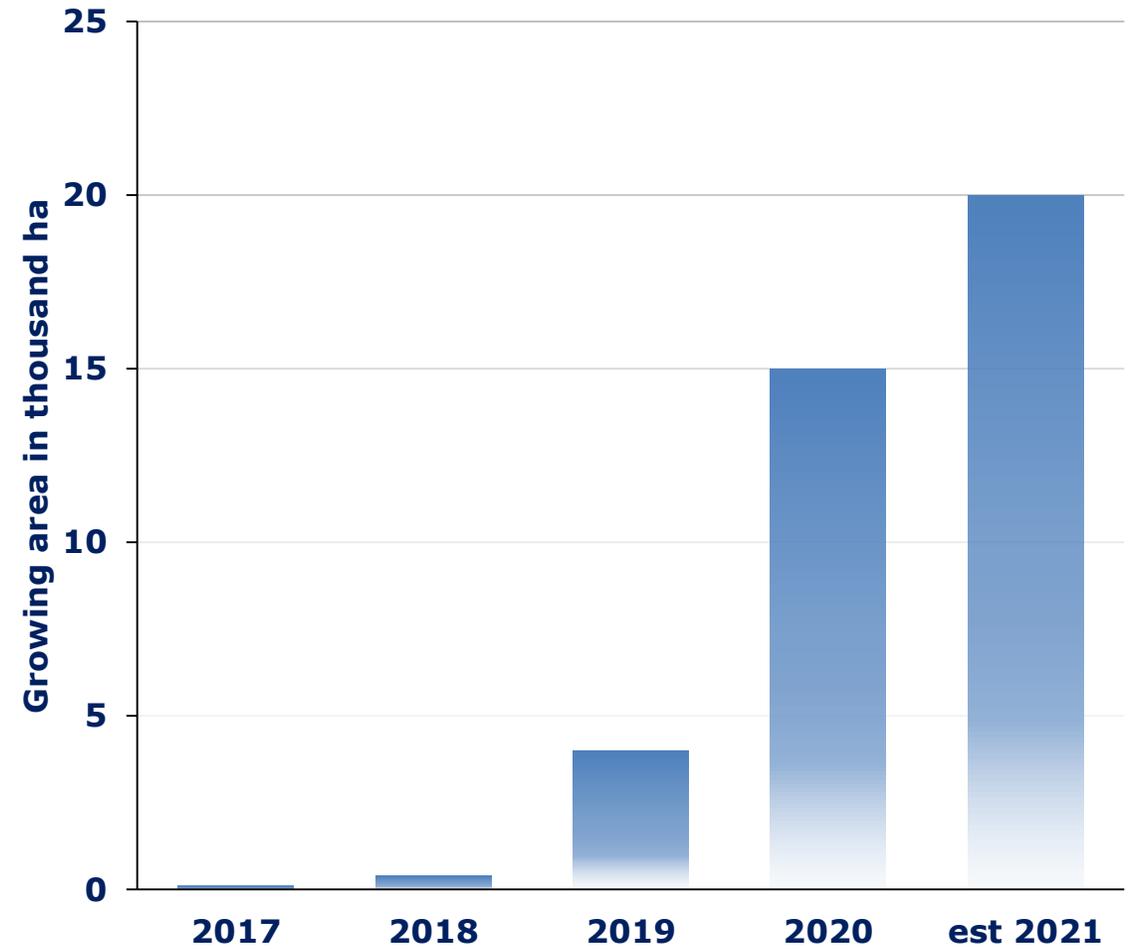




Growing area: potential for expansion



Maize & Beans growing area Germany in t ha





Success in Holland ...



... in China ...



Pic: Yuting



... and in USA



WISCONSIN
UNIVERSITY OF WISCONSIN-MADISON

Pic: Travis

Maize for beans – lodging tolerance



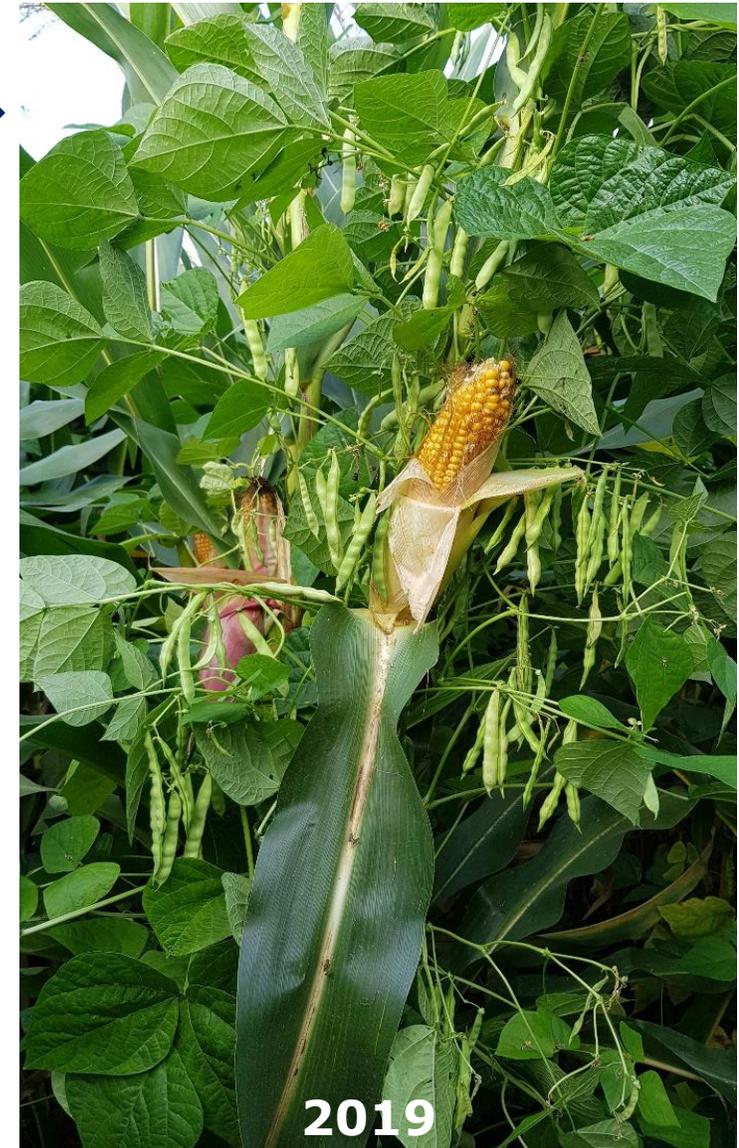
→ Highly lodging tolerant maize is generally suitable

Beans for maize – breeding



Breeding

- ✓ **Small seed**
- ✓ **Late mature**
- ✓ **Low phasin**
- ✓ **Good yield**





Lectin in beans – Feeding allowed

ZUKUNFT LANDWIRTSCHAFT
DLG.
MITTEILUNGEN

BETRIEBSZWEIG MILCH | Mais-Bohnen-Gemisch

Eine Alternative für die Ration

Weil die Bohne Phasin enthält, wurde die Mischung aus Mais und Stangenbohnen bisher kaum in der Fütterung genutzt. Doch das Problem ist inzwischen gelöst, zeigen Willmar Leiser, Daniel Brugger und Katharina Kastens.

bioland
klar | kritisch | konstruktiv



Phasin = lectin in beans

Multiple articles in agricultural journals showed, that feeding maize-bean silage for cows is harmless and the intercropping system has a big advantage for farmers

top agrar

Stangenbohnen für Milchkühe

In Deutschland wachsen auf etwa 4000 ha Mais und Stangenbohnen im Mischanbau. Pioniere schätzen die Silage als Futter für Milchkühe. Hat die Bohne Potenzial zur Proteinalternative?



Auf gute Nachbarschaft Maissilage mit Bohnen aufwerten

Wer Mais zusammen mit Stangenbohnen anbaut, erhöht den Eiweißgehalt in seiner Silage. Das ist gut für die Rinderfütterung. Zudem reduzieren proteinreiche Mischsilagen Sojaimporte aus Übersee.

Von Daniel BRUGGER und Willmar LEISER

Partner

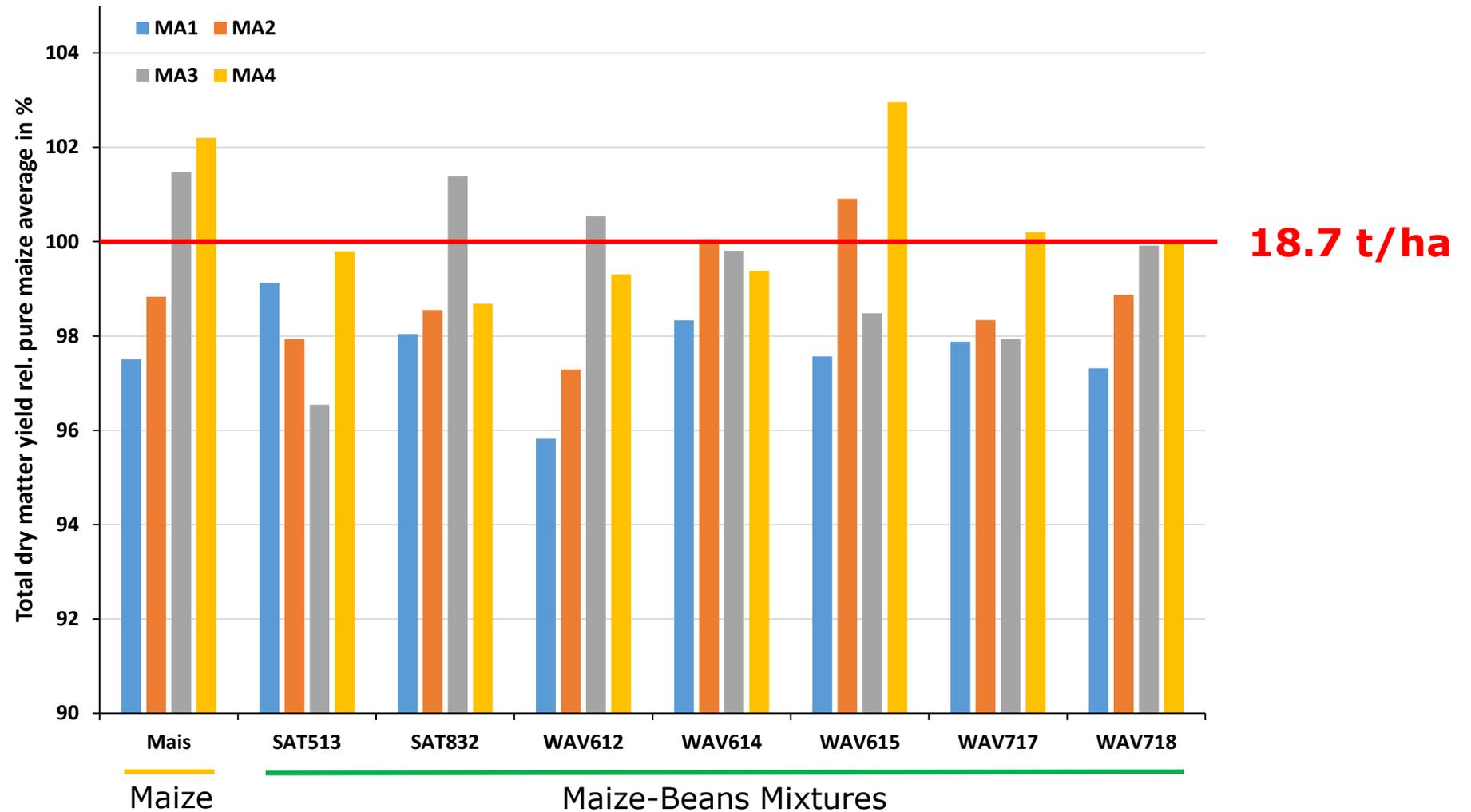


Technische Universität München



Good yields with mixtures

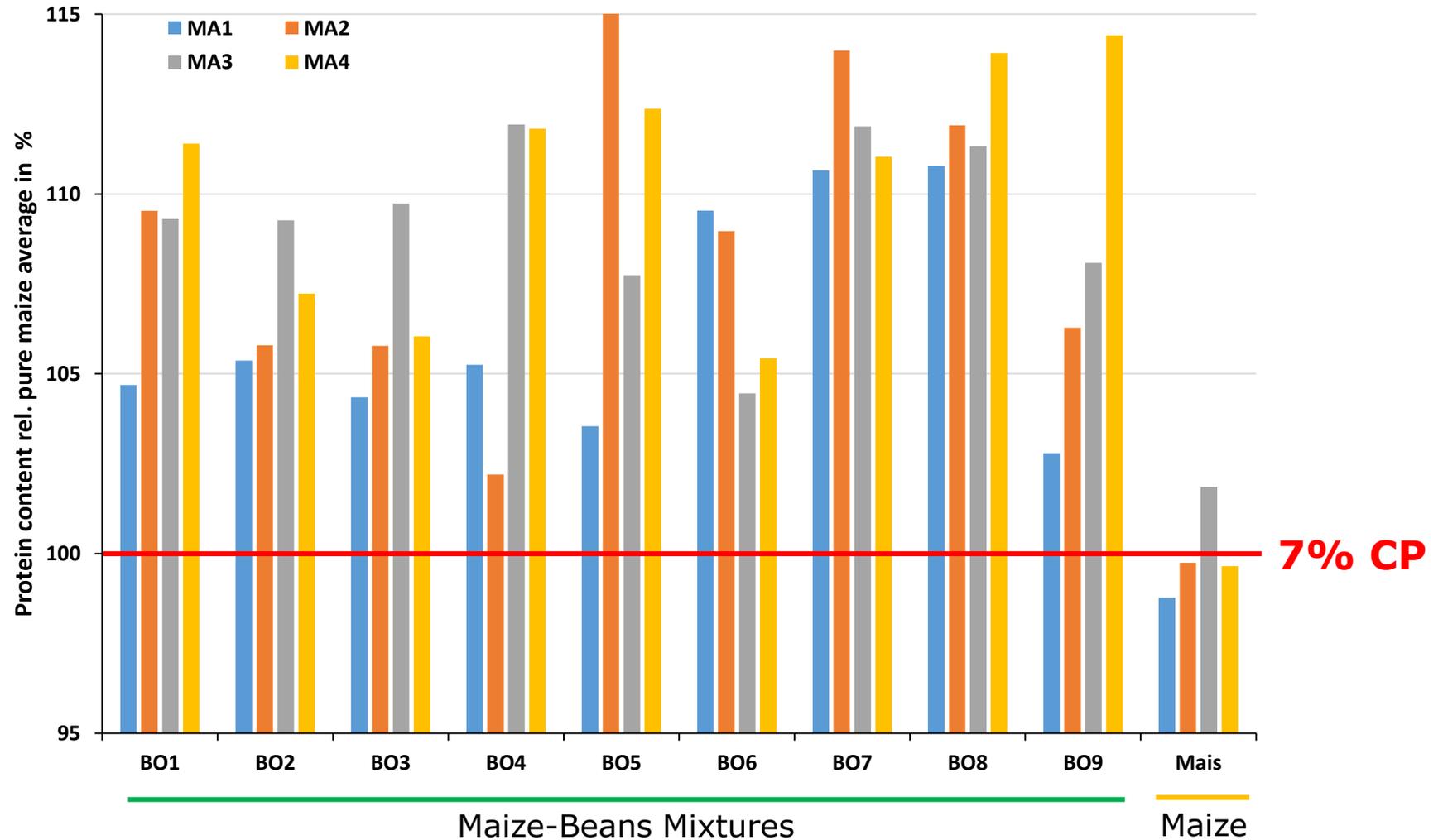
Total dry matter yield across four locations in 2020





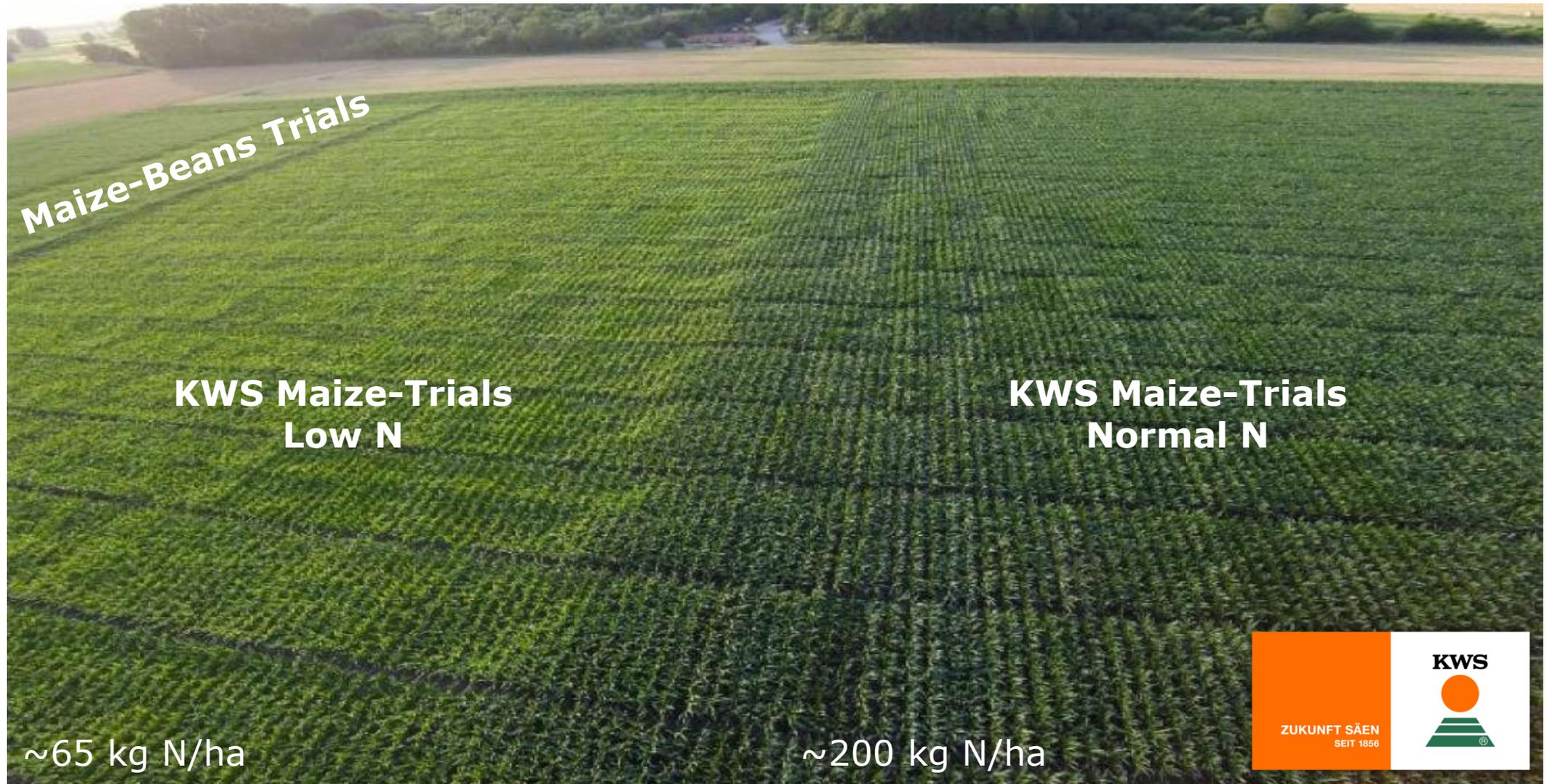
More protein content with mixtures

Crude protein content across two locations in 2019





Low-N trials show potential

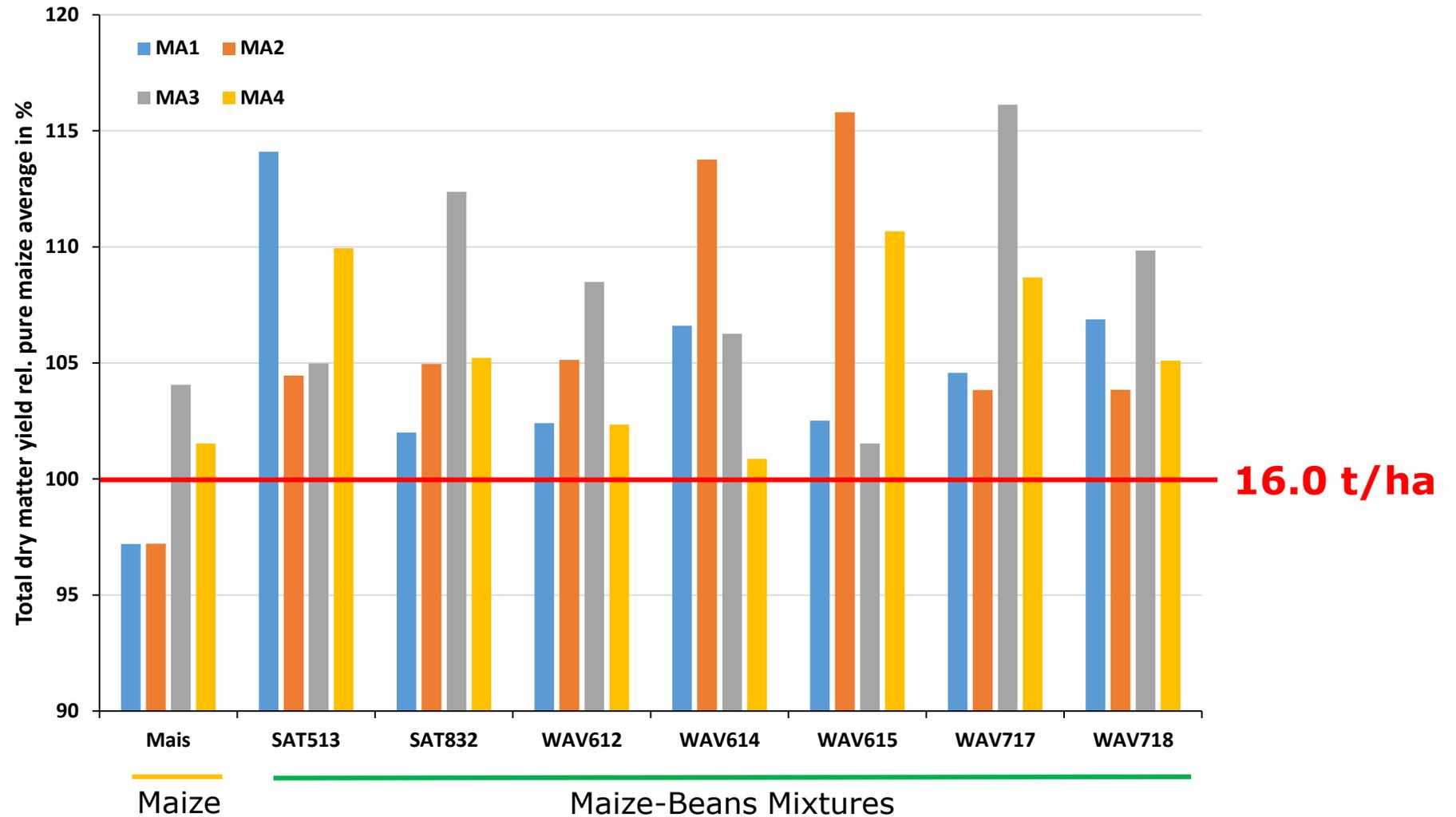


Pic: KWS



Better yields under low N

Total dry matter yield in one low-N location in 2020





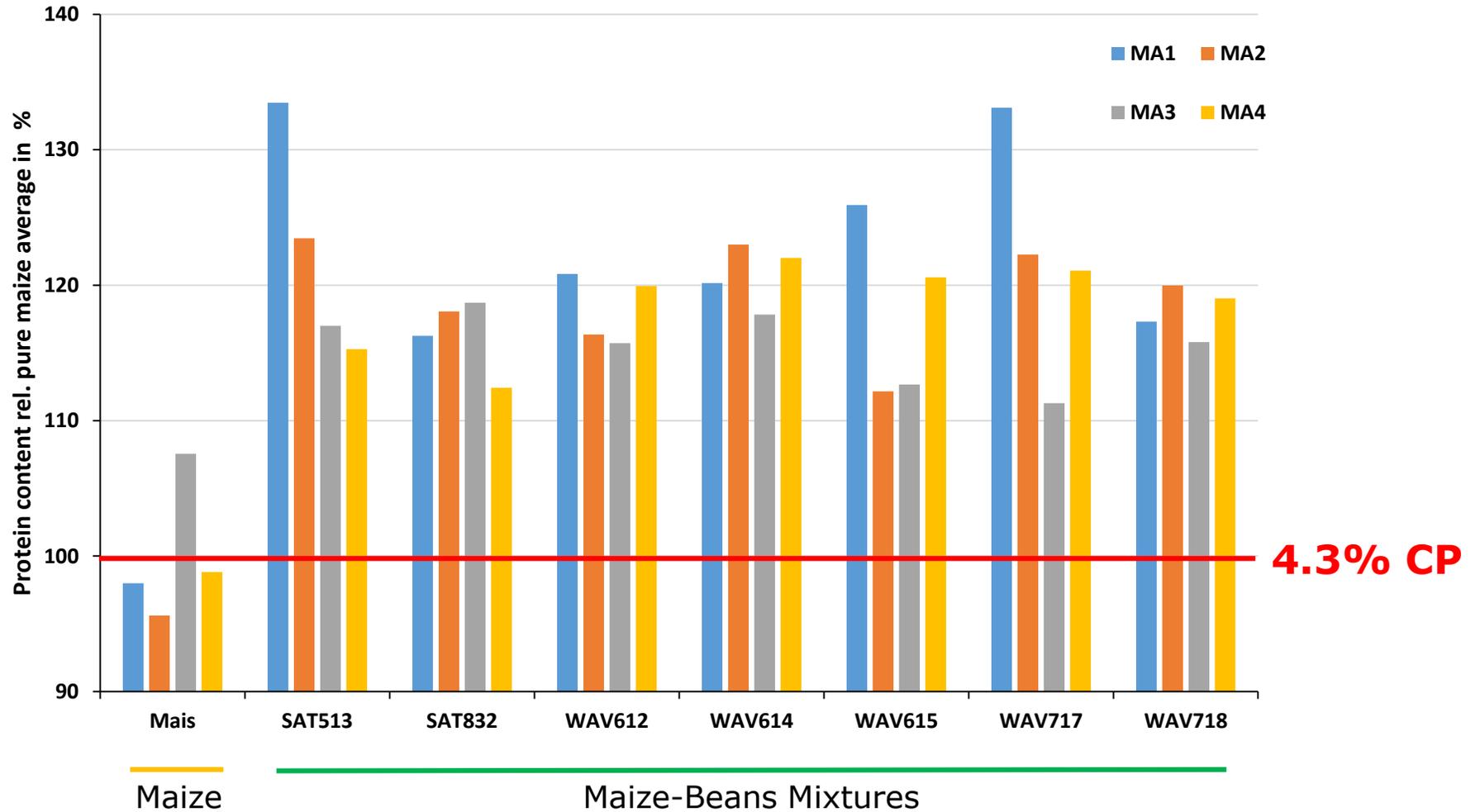
Benefiting from beans under low N





Much more protein under low N

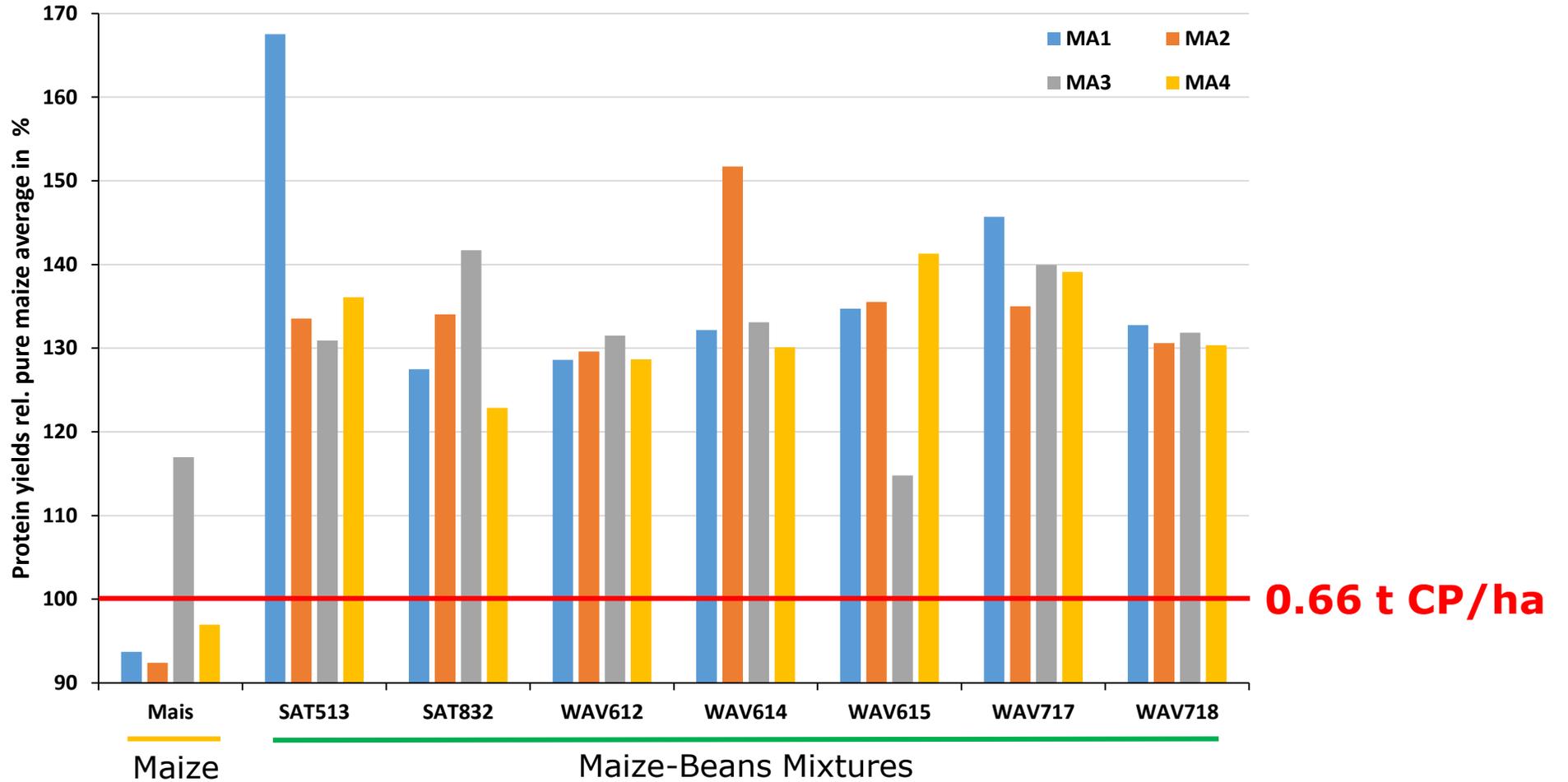
Crude protein content in one low-N location in 2020





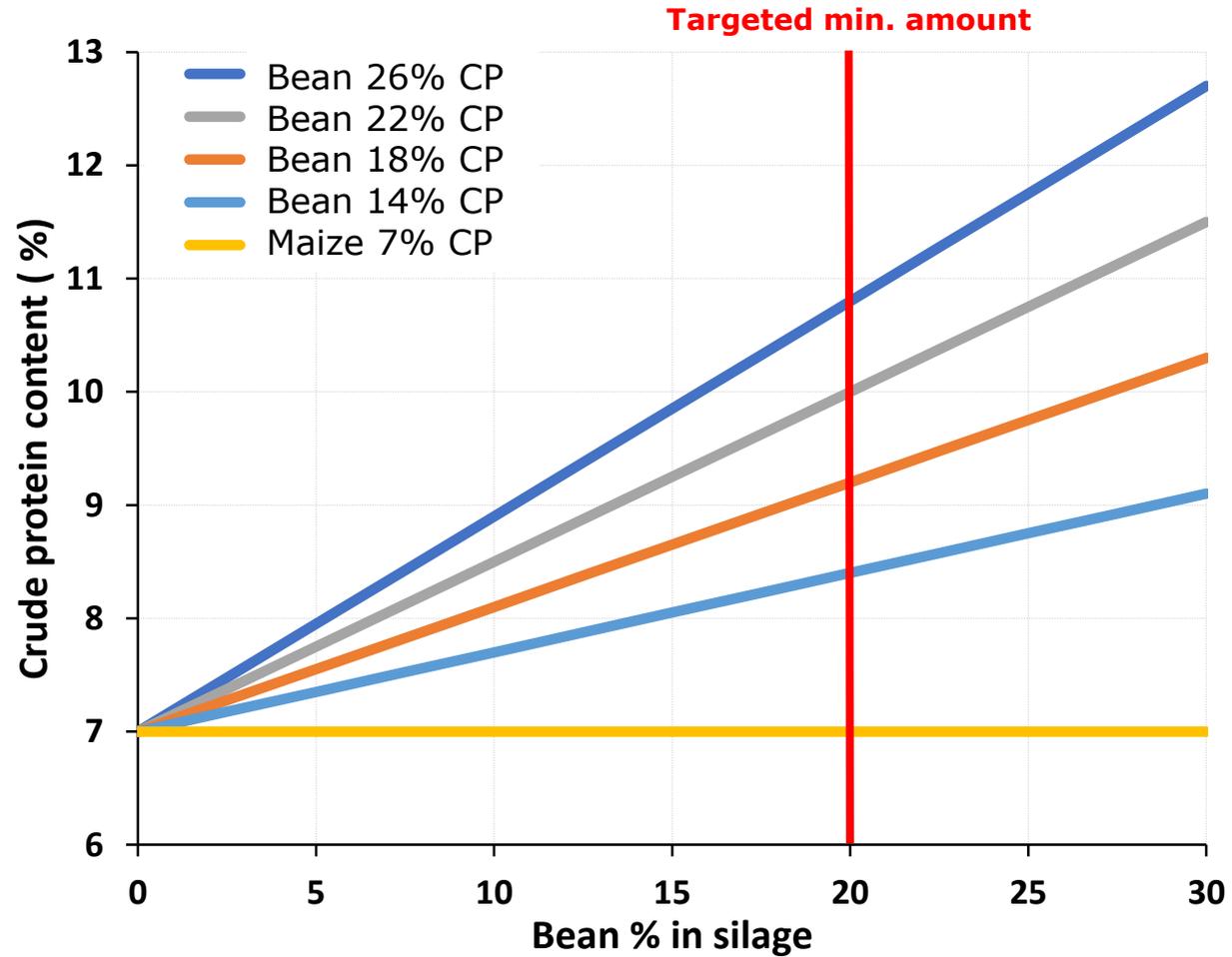
Highest protein yields under low N

Crude protein yields in one low-N location in 2020





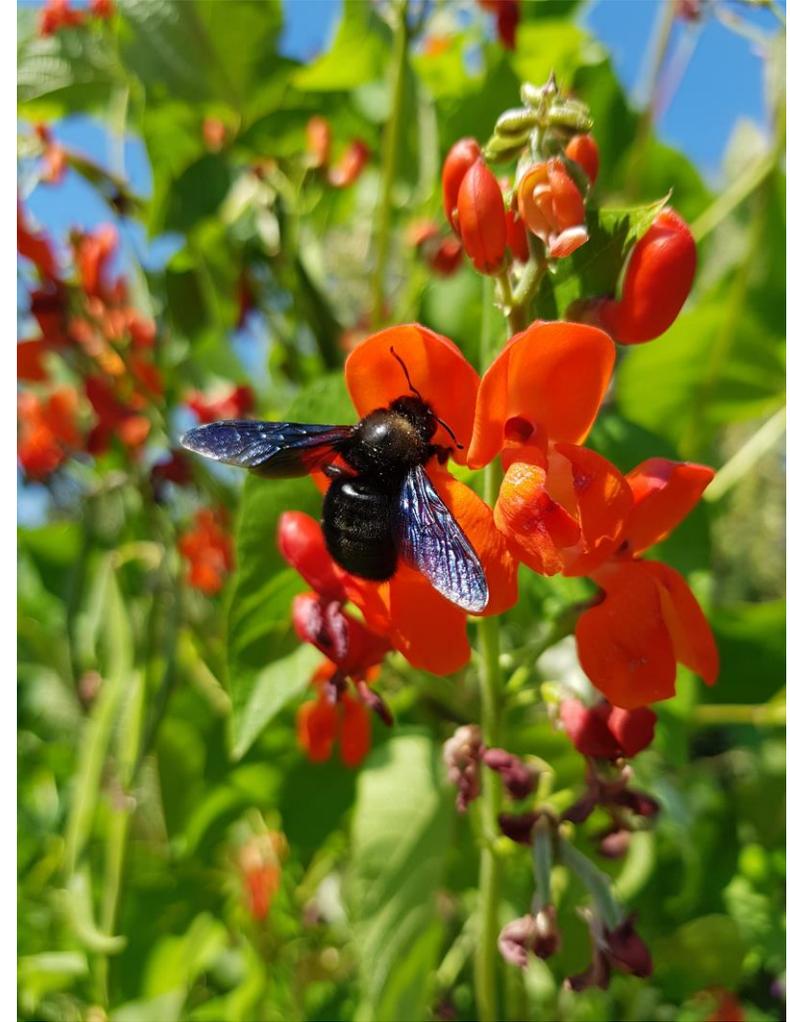
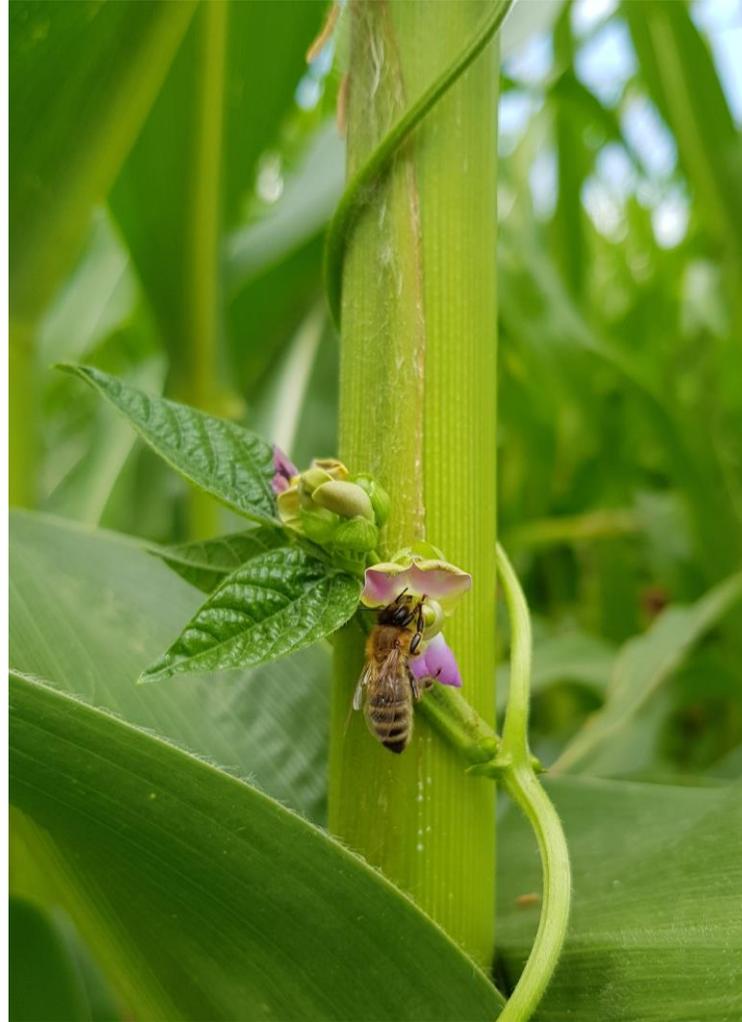
Even more protein possible



→ Further increase of protein content is possible

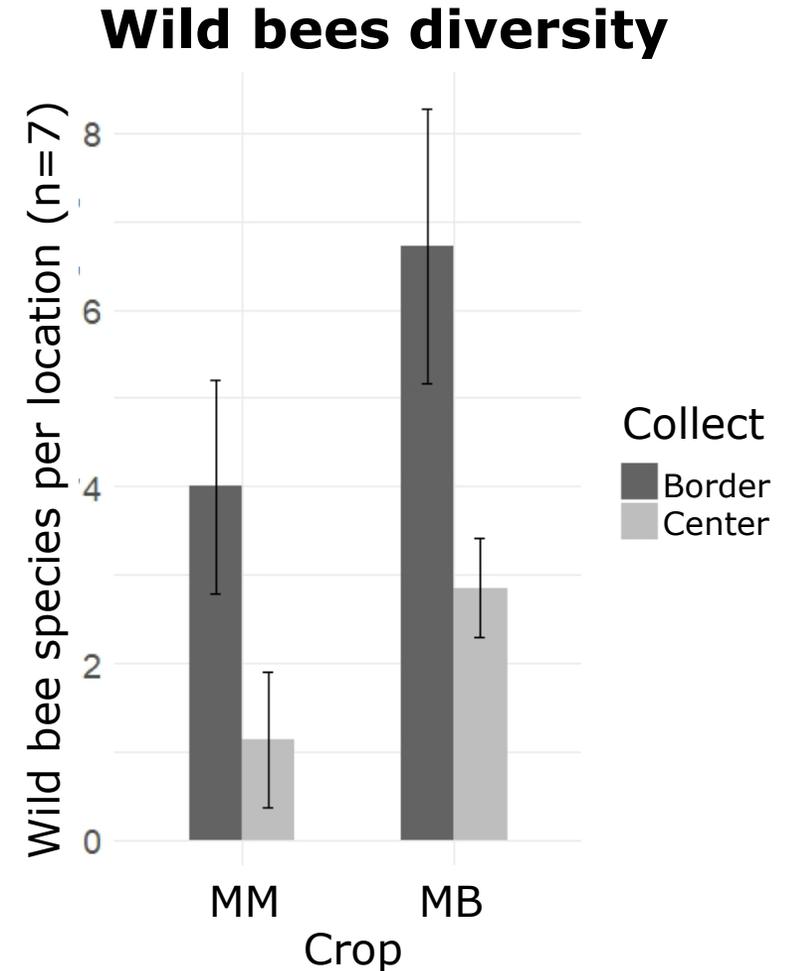
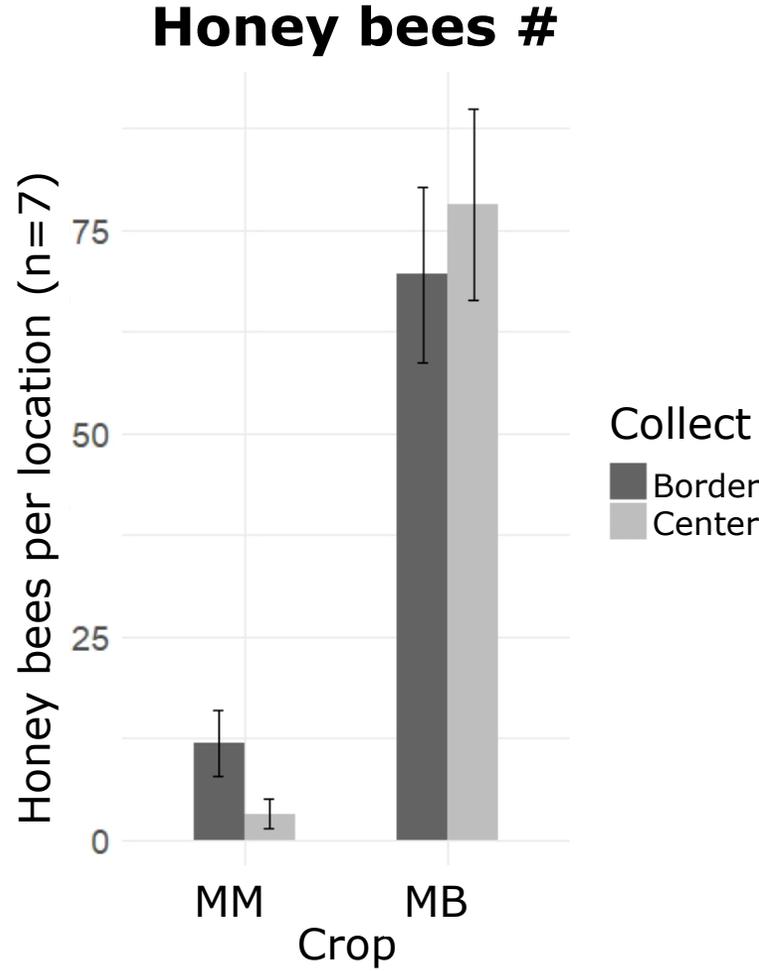
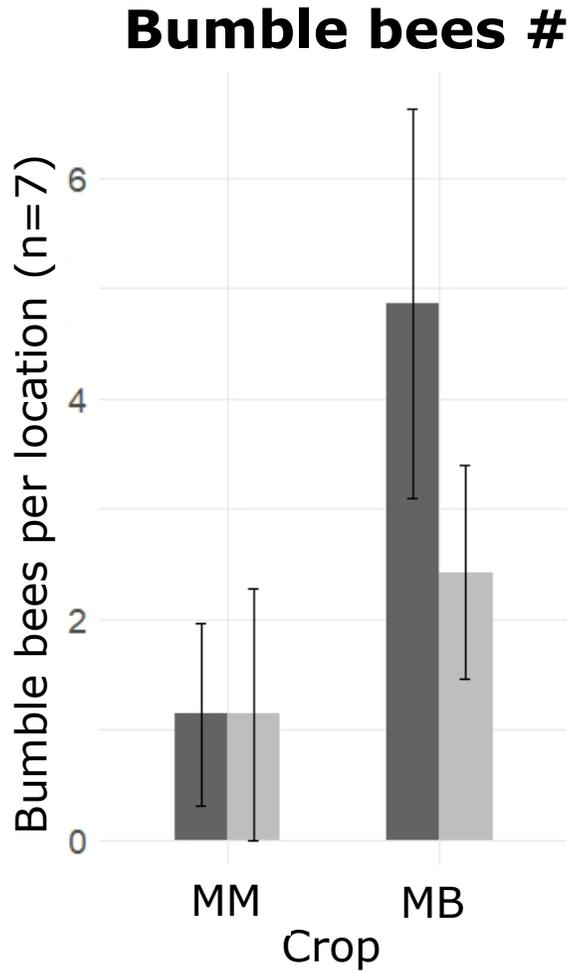


Much more than just yield





More insect diversity



→ More bumble bees, honey bees, wild bee species in maize & bean mixtures



Thank you