

# Nitrogen use efficiency of maize and cotton in 1.32 Mha of commercial farms in Brazil

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Large farming companies are increasingly concerned with environmental indicators because of the external market. Need to monitor farming practices

## Study:

- Data from 2011 to 2019 of 4,519 commercial fields (1.32 Mha) grown with maize and cotton
- 2 crops per year in different rotations  
*2<sup>nd</sup>. season usually after soybeans*
- N export (grain and link yields vs. N content) and actual N applied to calculate N Surplus and NUE

## Main results:

- Maize: N surplus in maize = 14 to 65 kg ha<sup>-1</sup>; NUE 64 to 89%
  - Lower N Surplus and higher NUE for 2<sup>nd</sup>. season maize grown after soybean with less N fertilizer
- Cotton: N surplus 52 to 67 kg ha<sup>-1</sup>; NUE 60 to 66%

Table 1. N surplus and NUE in commercial cotton and maize in 1.32 Mha

Crop	N rate	Yield	kg N ha <sup>-1</sup>	
			N surplus	NUE
Maize (1 <sup>st</sup> )	176 ± 35	7,980 ± 2,259	65 ± 37	64 ± 18
Maize (2 <sup>nd</sup> )	100 ± 24	6,556 ± 1,975	14 ± 30	89 ± 30
Cotton (1 <sup>st</sup> )	164 ± 24	4,144 ± 930	67 ± 32	60 ± 16
Cotton (2 <sup>nd</sup> )	143 ± 30	3,860 ± 829	52 ± 35	66 ± 18

Maize 1<sup>st</sup> season: 156 farms; 2<sup>nd</sup> season: 1790 farms.  
Cotton 1<sup>st</sup> season: 1839 farms; 2<sup>nd</sup> season: 734 farms.

## Conclusions

- Average N Surplus, N export and NUE are within the desired range of values of the conceptual framework of the EU Nitrogen Expert Panel
- Results indicate that in general no excess N is being used in those farms with large scale commodity production

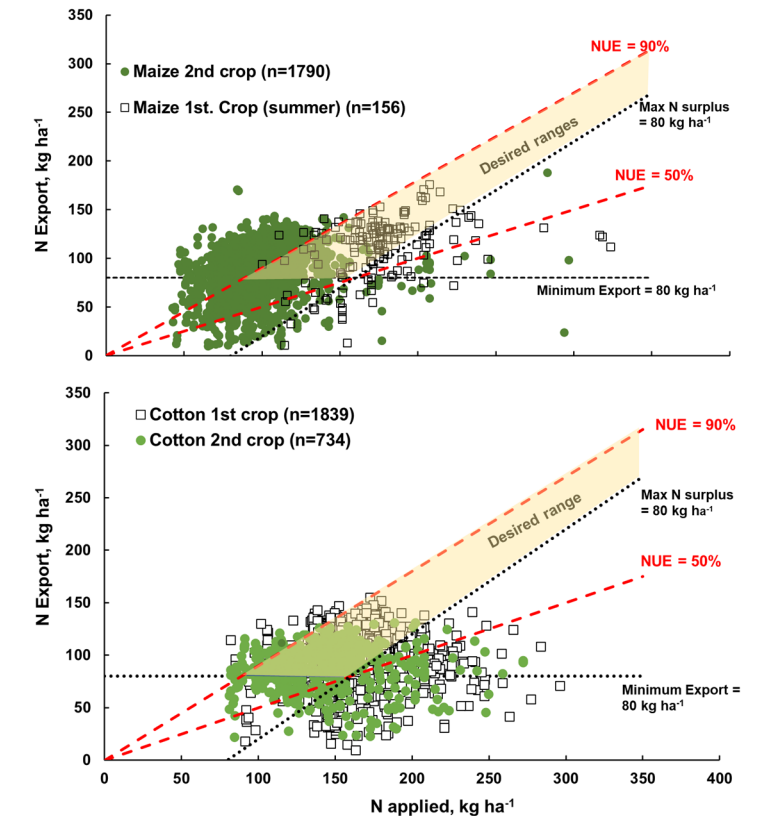


Fig. 1. Conceptual framework of NUE of maize and cotton in 4,519 commercial farms from 2011 to 2019

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## Literature:

Oenema O, Brentrup F, Lammel J, Bascou P, Billen G, Dobermann A et al. 2015. *EU Nitrogen Expert Panel - Nitrogen Use Efficiency (NUE) - an indicator for the utilization of nitrogen in agriculture and food systems*, Wageningen University - Alterra