

# Practical fertilization in maize using catch crops and organic fertilizers

## Problem

Maize is one of the most important crops, especially on dairy farms. Because dairy farms are so nutrient-rich, they are often associated with nitrate leaching (DeBoer, 2017).

## Solution

To avoid N leaching during the winter period, the implementation of catch crops is important. Together with root fertilization and organic fertilizers, nitrogen can be used very efficiently and mineral fertilizers can be replaced.

## Advantages

The combination of catch crops and organic root fertilization stabilizes yields, reduces costs for mineral fertilizers and reduces necessary storage for slurry or manure. At the same time, N-losses in the environment are reduced.

## Practical recommendation

### Catch crop:

- Apply ~60 kg N/ha after harvest of main crop, followed by sowing of 25 kg/ha catch crop (e.g., mustard/oil radish)
- Mulch growth in March, followed by first application of organic fertilizers and intense grubbing

### Maize:

- Reduce planned N-fertilization by 20-30 kg N/ha (catch crop, depending on climate)
- Inject organic fertilizer (up to 25m<sup>3</sup>/ha) with marking of track 5-7 cm deeper than planned sowing depth
- Sow maize in strips placed directly over the injected slurry lines
- Finish N fertilization early, with calcium ammonium nitrate for example
- For dryer conditions, low P contents or other less suitable conditions, reduce organic fertilization and add mineral NP-fertilizers for root application in the same amount



Picture 1: Sowing catch crop combined with tillage (Photo: Markurs Cordsen, CALS); Picture 2: Injecting organic fertilizers before maize sowing (Photo: Wolfgang Ehrecke, CALS)

## Applicability box

### Theme

Soil quality and fertility, Nutrient management, Yield stability

### Geographical coverage

>80mm precipitation in early autumn, at least 8 weeks of vegetation after harvest of main crop, sandy to loamy soils (good warming in spring). Suitable for Atlantic and continental European climate conditions.

### Application time

After harvest of main crop for catch crop + April, May

### Required time

-

### Period of impact

Actual crop with increasing benefits over the years

### Equipment

Slurry injection, single-grain seeder (GPS control)

### Best in

Maize

Table 1: Example for fertilization strategy maize with catch crop

Strategy	N [kg/ha]	P <sub>2</sub> O <sub>5</sub> [kg/ha]
Demand (45t/ha fresh matter)	200	90
Release catch crop	-25	-20
Release soil	-35	
1. organic fertilization (70% N-availability)	-65	-38
2. organic root fertilization (70% N-availability)	-65	-38
Mineral fertilization	-15	
Nutrient balance	-5	-6

## Further information

### Further reading

- de Broer, H. (2017). *Nitrate leaching from liquid cattle manure compared to synthetic fertilizer applied to grassland or silage maize in the Netherlands*. Wageningen: Wageningen Livestock Research

### Weblinks

- Results of field trials regarding water protection, Chamber of Agriculture Lower Saxony (<https://www.lwk-niedersachsen.de/index.cfm/portal/77/nav/1667/article/22261.html>)
- Project “Optimizing of nitrogen- and phosphate-efficiency of liquid organic fertilizers by “depot-application” to minimize environmental impacts” ([https://fisaonline.de/projekte-finden/projekte-nach-fachgebieten/details/?tx\\_fisaresearch\\_projects%5Bp\\_id%5D=8299&tx\\_fisaresearch\\_projects%5Baction%5D=projectDetails&tx\\_fisaresearch\\_projects%5Bcontroller%5D=Projects](https://fisaonline.de/projekte-finden/projekte-nach-fachgebieten/details/?tx_fisaresearch_projects%5Bp_id%5D=8299&tx_fisaresearch_projects%5Baction%5D=projectDetails&tx_fisaresearch_projects%5Bcontroller%5D=Projects))

## About this practice abstract and DiverIMPACTS

### Publishers

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**Project website:** [www.diverimpacts.net](http://www.diverimpacts.net)

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