Kverneland

PUDAMA

We believe that with intelligent and efficient farming systems we contribute to sustainable agriculture, serving the world's growing population.

Farmer challenges

The costs for fertiliser have risen exponentially and **resources are limited**. Still, **healthy plant growth** is the basis for our customers' yield and profit, as well as for a safe food production. At the same time, the protection of the **environment** has become a key topic of today's agriculture. Due to the risk of contaminated **groundwater** and local over-fertilisation with organic fertilisers, recent **European regulations**, rules and policies have defined new standards and reduced the kinds of components allowed. Moreover, **society's acceptance** for fertiliser and crop care products has decreased.

We care with utmost precision and efficiency

Apply fertiliser more precisely, efficiently at the right time and only where the plant can reach it and only as much as needed. Synchronised with the seed application at high speeds, a deposit of fertiliser is placed under each maize corn to give **young plants the best start conditions for optimum root development, rapid growth and good plant health**. Every seed has an optimal fertiliser deposit at its disposal, **no fertiliser is wasted** or washed out.

Kverneland PUDAMA system

The PUDAMA system **ensures the reduction of at least 25% of fertiliser** compared with the continuous application of fertiliser - whilst **maintaining 100% yield.** The PUDAMA system has been incorporated in the Optima TFprofi and Optima F with SX high speed row, offering reliability by high expertise in precision drills and proven machinery – proven by independent results from Universities.

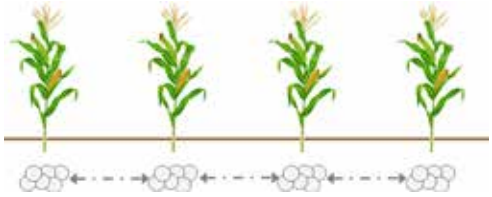
TECHNOLOGY

Fertilisation ensures the supply of nutrients to the crop, but over-fertilisation often has undesirable effects on the environment and the ecosystem of the land. Conventional band application places a continuous band of fertiliser also between the plants where the roots cannot reach it. This is the amount simply wasted and washed out.

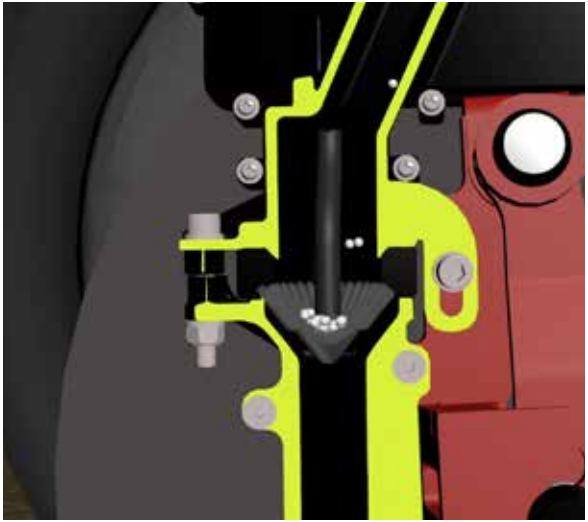
With PUDAMA the amount and location of the fertiliser is precisely defined. The nutrients are only deposited where the roots of the plant can reach it and only as much as needed. Synchronised with the seed application at high speeds, a deposit of fertiliser is placed under each maize corn during maize seeding. Every seed has an optimal fertiliser deposit at its disposal. The full amount of fertiliser is absorbed by the plants. In this way, loss and leaching is avoided and 25% of fertilizer production using fossil fuels (CO_2) can be saved.

The PUDAMA Technology is based on a three-year study on the precise application of fertiliser whilst maize sowing. Kverneland Group Soest in close co-operation with researchers of the University of Cologne show-proved that the precise application of fertiliser at sowing allows the reduction of at least 25% without any loss in yield (Bouten et al., 2020)!

CONVENTIONAL FERTILISER BAND



PUDAMA FERTILISER SPOTS



PRECISE METERING AND SYNCHRONIZED DEPOSIT

- A defined fertiliser depot is produced and deposited analogous to the driving speed and seed distance in the furrow.
- The fertiliser is placed by an air stream 5cm below and sidewards to the seed.
- The PUDAMA system has been incorporated in the Optima TFprofi and Optima F with SX high speed row.

1. PUDAMA Application

2. Maize without Starter Fertiliser

3. Conventional Fertiliser Band

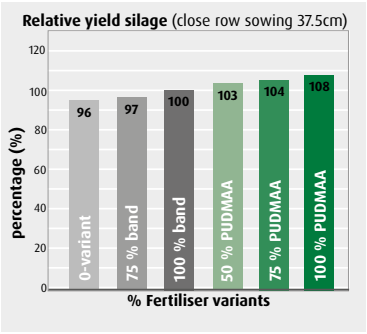
THE RESULTS

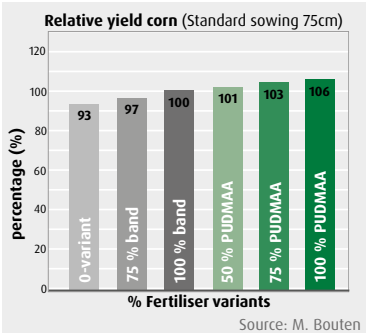
The PUDAMA system ensures the **reduction of at least 25% of fertiliser** compared with the continuous application of fertiliser - whilst **maintaining 100% yield** of silage and corn maize. Researches show that roots can only reach and effectively utilize fertilizer within a 5 cm radius during the juvenile phase.

With technology such as the Kverneland Optima TFprofi SX PUDAMA precision drill, farmers can save a lot by reducing fertiliser, transport and work costs. For example, if a farmer with 500ha of maize uses 200kg/ha DAP 18-46 in the conventional way, he would save 50kg/ha of fertiliser with the PUDAMA system. This means a saving of 12,500€* for 500ha.

Root growth starts directly in the direction of the starter fertiliser. No energy is wasted. Strong plants, especially in the sensitive youth stadium,with strong roots ensure that the plant is more resistant even under extreme conditions such as prolonged drought.

(*Source: index mundi: Price DAP 500€/t Apr. 2024)

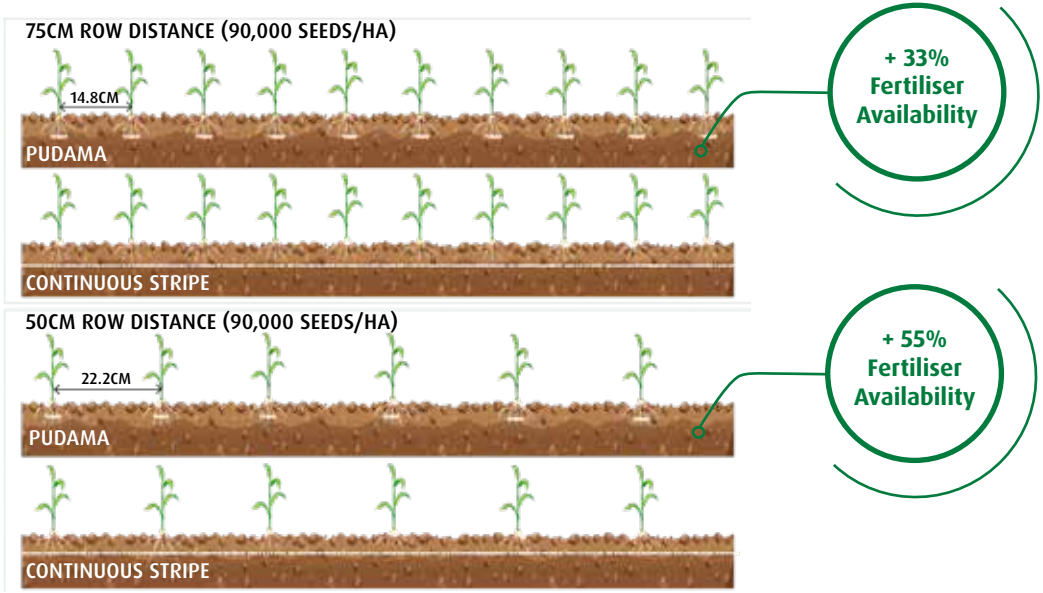




Source: M. Bouten

PUDAMA EFFECT ON ROW WIDTH

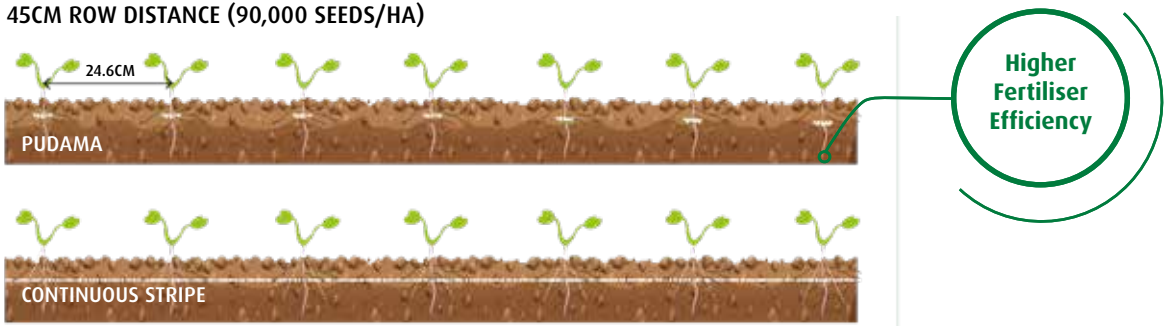
The PUDAMA effect of saving fertiliser is even higher if the row spacing is closer. A more narrow row spacing with the same number of plants per hectar means that the distance between each plant in the row is wider. According to the hyptohesis, can only access fertilizer within a 5cm distance during youth period. As a result, the efficiency of fertilizer availability for the roots increases by 33% or 55% depending on row distance.



PUDAMA TRIALS IN VARIOUS CROPS

Kverneland is also testing the PUDAMA system in various crops such as sugar beets or sunflowers. Initial results confirm the PUDAMA effect by increasing the fertilizer efficiency.

45CM ROW DISTANCE (90,000 SEEDS/HA)



AVAILABILITY

The PUDAMA system has been incorporated in the Optima TFprofi and Optima F with SX high speed row.

Kverneland Optima TFprofi

Kverneland Optima F

CALCULATION

PUDAMA increases the economical advantage by reducing field logistics, higher machine utilisation and the savings of fertiliser. Here a calculation as example:

Fertiliser application rate	200kg/ha
PUDAMA savings potential	25%
PUDAMA fertiliser application rate	150kg/ha
Savings fertiliser	50kg/ha

Annual acreage implement	500ha/year
Fertiliser savings	25,000kg Fertiliser/year

Fertiliser price	500€/t*

Savings	25€/ha (= 25t x 500€/t : 500ha)
Savings in €	12,500€/year

Note: The values listed are to be considered as example and can be individually adjusted to suit the specific operation.
(*Source: index mundi: Price DAP 500€/t Apr. 2024)

Kverneland

WHEN FARMING MEANS BUSINESS

kverneland.com/PUDAMA

kverneland group