

grow



Drip Irrigation – Drip Hoses in the Root Zone

About

This case study highlights a 55-year-old farmer in the Upper Palatinate region of Germany who installed an underground drip irrigation system as a precise, water-saving alternative to his over-30-year-old sprinkler system. The investment was made to meet climate change challenges and public expectations for sustainable water use, offering a long-term, efficient solution for deep-rooted crops.



The Challenge

Key challenges included:

- High investment costs:** Approximately €6,000 per hectare, economically viable primarily on owned land.
- Technical requirements:** Planning, approval, and correct installation of underground hoses at 40 cm depth and 1 m spacing.
- Risk management:** Avoiding hose damage from traffic, adapting soil cultivation, and managing frost protection.
- Crop limitations:** System unsuitable for shallow-rooted plants.

The challenges were crucial as the soil had a low fertility rating (54 points, gravel soil) and the farm needed an efficient, sustainable solution for water supply under climate pressures.



THE SOLUTION

The farmer addressed these challenges by:

- Using a special pulling machine to install hoses at the correct depth and spacing.
- Continuously adjusting irrigation practices according to weather and frost events.
- Targeting irrigation to high-value, deep-rooted crops such as bush beans.
- Optimizing plant care with root-zone-specific watering, improving nutrient uptake and oxygen exchange while eliminating the need for fertilization.

IMPACT AND RESULTS

The underground drip irrigation system produced measurable results:

- Yield increase:** Bush bean yields doubled from 10–14 tons/ha to 20 tons/ha.
- Reduced operating costs:** One-third lower costs for water, energy, and fertilizer.
- Water efficiency:** Eliminated 30–40% evaporation losses from previous sprinkler systems.
- Plant health:** Improved nutrient uptake, oxygenation, and overall crop quality.
- Longevity:** Drip hoses last 25–30 years, enabling long-term planning.

Lessons Learned & Next Steps

The system is highly effective for deep-rooted crops but requires adapted crop selection. Careful management is needed to avoid hose damage. Overall, underground drip irrigation enables higher yields, lower costs, and precise, loss-free water delivery, making it a sustainable investment for climate-resilient farming.

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