

Can **new organic cropping systems** produce vegetables with lower use of resources and losses of nitrate?

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Introduction

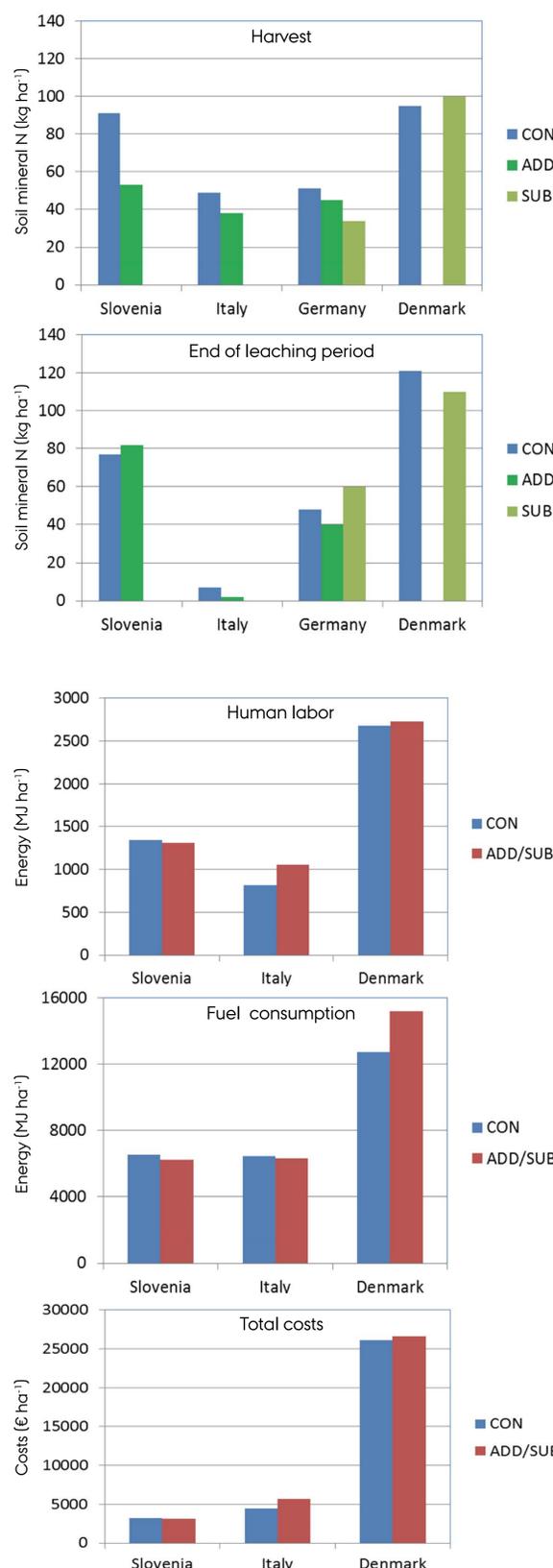
To secure a sustainable production of plant foods, there is a need to develop new cropping systems. The aim was to study new organic cropping systems for production of vegetable crops; and the systems' effect on energy consumption, total costs and on the risk of polluting waters with leaching of excess nitrate.

Materials and Methods

Field trials were performed in Italy, Slovenia, Germany and Denmark with cauliflower grown as sole crop (**control: CON**) or intercropped with an in-season living mulch of legumes to exploit ecosystem services by attracting beneficial insects, suppressing weeds, and taking up excess nitrate from the production. The living mulch was grown between crop rows (**addition design: ADD**) or replaced every third row of cauliflower (**substitution design: SUB**).



Cauliflower intercropped with a living mulch of grass-clover (*Trifolium repens*, *Lolium perenne*), Aarslev, Denmark.



Results and discussion

Results from the first year of experiments show that cauliflower intercropped with living mulch compared to sole cropping resulted in:

- Similar yields and quality of cauliflower in all treatments.
- Excess nitrate tended to decrease with the addition design, not with the substitution design.
- Energy consumption increased +14 to -4% depending on management and interactions with weeds in each country.
- Costs increased +22 to -2% depending mainly on differences in labour costs between countries.

Conclusions

The technology of intercropping of crops and living mulches needs further development to achieve high production with significantly lower use of resources and leaching losses of nitrate.



Cauliflower intercropped with a living mulch of burr medic (*Medicago polymorpha*), Le Marche, Italy.

Acknowledgements:

The work was performed as part of the project InterVeg: Enhancing multifunctional benefits of living mulch – vegetable intercropping funded by CORE organic II.

