

SureVeg final project summary



Preparation of compost as alternative fertilization product. Right: Celeriac and leek growing in an intercropping system in Belgium.

Project purpose

The objective of the SureVeg project was to develop and implement new diversified, intensive organic vegetable cropping systems. This included the use of inter- and strip-cropping and fertility strategies based on soil improvers and fertilizers from either plant or animal origin, compared to monocropping systems and commonly used animal based fertilizers in organically managed cropping systems.

Final project summary

The SureVeg projects found that

- Intercropping and strip-cropping appear to farmers as promising systems for replacement of monocultures, but they ask for better comprehension of the systems in practice, e.g. on good companion crops and step-by-step guidelines.
- A method has been developed for mining the scientific literature on good companion crops that will enable uncovering crop-crop effects as well as crops that have remained under-investigated compared to their on-farm use.
- The success of intercropping for crop yields and nitrogen use efficiency depends on crop species' characteristics (complementary instead of competing) and control by management (e.g. displacement of sowing/planting time). Therefore the choices of species and management, when designing intercropping systems, are crucial and should be knowledge-based.
- Intercropping and strip-cropping can influence general and functional biodiversity of organisms and the agro ecosystem services they provide (natural biological control, pollination, soil health and fertility; above and belowground) in a complex way that

interplays with factors, such as annual differences in agronomic conditions and crop choices. E.g. intercropping may increase mycorrhization and decrease soil pathogenic bacteria and fungi compared to mono-cropping. While diversity of ground dwelling carabids has been found to go up, some species decrease in abundance compared to monocultures.

- Alternative fertility strategies based on the combination of a fast and slow releasing source of organic amendments can sustain crop growth, increase short-term soil fertility and might promote soil carbon storage in the long-term. The combination of organic amendments (the quality) is crucial, and 100% plant-based sources can replace animal-based ones without jeopardizing yields.
- The combination of intercropping and alternative fertility strategies did not show synergistic effects.
- The creation of smart automated machinery was completed to solve challenges of mechanization in inter- and strip-cropping systems including a proof-of-concept robotic tool, sensing and actuation, to apply single-plant fertilizer strategies. The robot including sensors etc. was built and algorithms developed e.g. to calculate single plant volume and vegetation indexes, and the robot was successfully demonstrated.

Overall a successful implementation of intercropping/strip-cropping systems and fertility strategies with beneficial impact on crop production, soil and environment of intercropping/strip-cropping systems and fertility strategies relies on detailed insight into the agronomic conditions and agroecological functioning in the production of organic vegetables. The SureVeg provides such new insight across European conditions from transnational research; insight that has been disseminated to stakeholders at many levels during the project.



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