

Abstract

1 Title of the project

Syn-Energy – climate and water protection through synergetic use of biomass – biogas from intercrops, residues and agricultural waste without increase of land use competition

2 Synopsis

For the energetic use of inter crops, integrated in crop rotations serving for food supply, production methods are further developed and decentralized biogas systems are designed suitable for biomass with low energy content and high transport cost. Additionally the effects on water resources, climate and the environment are investigated.

3 Abstract

Background

The cultivation of energy crops is discussed controversially. On the one hand renewables are seen as a requirement for sustainable energy supply and security. On the other hand the use of agricultural land for energy production was blamed to reduce security of food supply and cause rise in food prizes. The predominant use of maize as feedstock for biogas production is also seen as a negative development, since it may cause negative environmental impacts (e. g. soil erosion, nitrate leaching). The way out of that dilemma is simply straight forward but also challenging: to use only those types of biomass for biogas production which are strictly not in competition with food or feed production (intercrops, straw, agro-wastes, manure etc.)

Objectives

The alternative for sustainable biogas production this project focuses on, is the use of intercrops as biogas feedstock: The production methods for intercrops and the potentials for biogas generation out of intercrops are investigated as well as the additional added values or benefits for water, climate and environmental protection. Additionally the project team is convinced that the successful use of intercrops for biogas production needs to be combined with other types of biomass not in competition with food supply. To enable the use of such biomass with relatively small total energy content and intercrops the set-up of the supply chain is seen as key parameter. Therefore the project will also deal with the design of alternative more decentralized set-ups for the biogas production. (e.g several separated rather small decentralized digesters which are linked by biogas pipelines to a single gas engine to produce power and heat at a place where the heat can be used effectively).

Methodology

The method used for that task is the process synthesis which is able to identify optimums for quite complex systems. By means of biogas digester lab scale experiments the potential of intercrops for biogas is measured. In a field test different kinds of intercrops are cultivated and monitored to state on yields and effects on ground water, soil and nutrition aspects. The scope of work involves i) the cultivation of typical intercrops in three different areas in Austria, ii) the scientific monitoring to evaluate biomass yields, model the leaching into ground water, N and C-balancing, iii) measurement of biogas potential of intercrops biomass in the lab scale, Analytics to describe the material, iv) the design of decentralized biogas systems v) optimizing the entire system from an economic and sustainability perspective (SPI sustainable production index), vi) to define further R&D needs and existing bottlenecks and to disseminate results.

Expected results

Results will be an estimation of the potential of energy supply by intercrops (biomass and biogas yields), the additional benefits for water protection, optimised biogas systems for the use of intercrops, key data for economic and sustainable performance of those systems, an overall synthesis of the results and recommendations for implementation and further R&D activities.

4 Project Manager

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5 Organisation

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