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Joint Project „The sugar beet as an energy crop in crop rotations on highly productive sites – an agronomic/economic system analysis

COMPETITIVENESS AND ECONOMIC RISKS OF ENERGY CROP ROTATIONS WITH AND WITHOUT SUGAR BEETS CONSIDERING THE INDIVIDUAL RISK ACCEPTANCE

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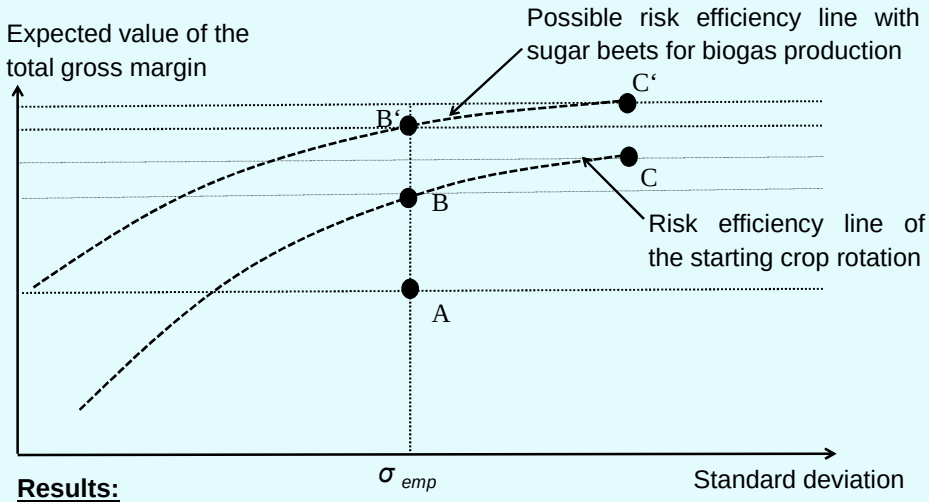
Motivation: In the context of biogas, sugar beets are widely discussed as an alternative crop. Nevertheless, to our knowledge, the economic effect of the integration of sugar beets for biogas production in crop rotations has not been analyzed.

Research question: Which economic effect has the integration of sugar beets for biogas production in crop rotations for single farms?

Data: Average yields on district level: Aiterhofen: district of Straubing, Harste: district of Goettingen, Etzdorf: district of Halle (source: Statistisches Bundesamt).

(In the long term: We aim to use the experimental data; but n=4 years has been too small for statistical tests, so far.)

Method: Farm optimization model (linear programming; taking into account the risk attitude of farm managers):



A: Production program of the starting crop rotation.

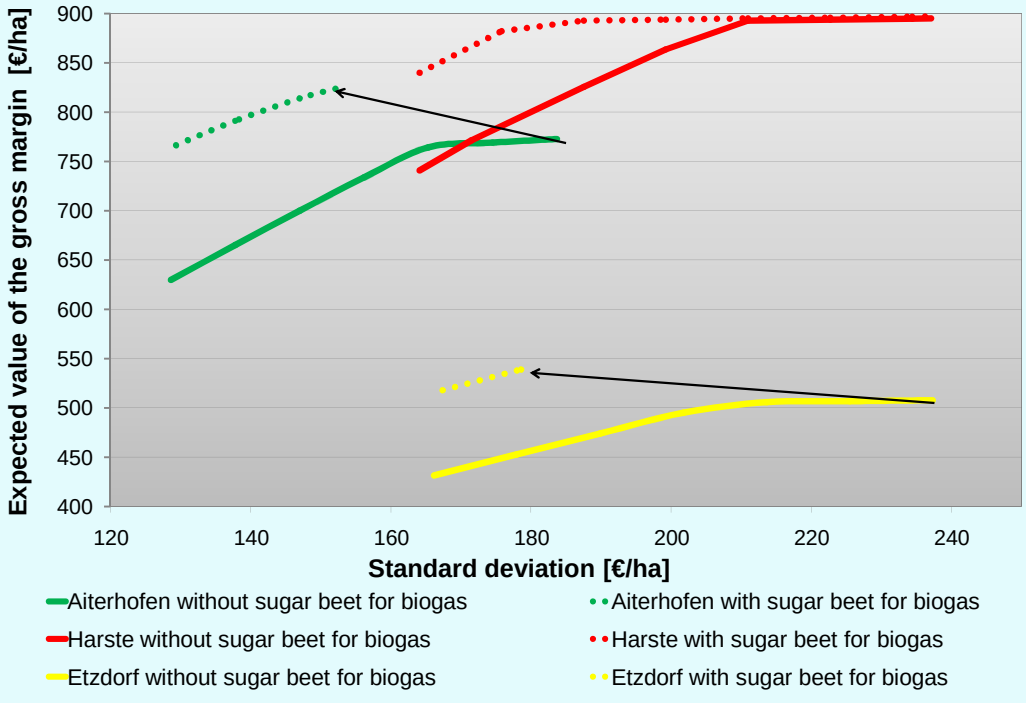
B: optimized production program of the starting crop rotation in compliance with accepted standard deviation.

B‘: optimized production with sugar beets for biogas production in compliance with accepted standard deviation.

C: production program of the starting crop rotation providing the maximum amount of total gross margin.

C‘: production program with sugar beets for biogas production providing the maximum amount of total gross margin.

Results:



The integration of sugar beets for biogas production in crop rotations:

- Aiterhofen and Harste: The maximum amount of the expected total gross margin increases. At the same time, the income risk decreases.
- Harste: No difference for the maximum amount of the total gross margin. But with an increasing risk aversion of the farmer, we find an increasing advantage of the crop rotation with sugar beets for biogas production.

Conclusions:

- The integration of sugar beets for biogas production in crop rotations causes an increase in the average expected gross margin for single farms.
- At the same time, the income risk decreases measured at the standard deviation of the expected gross margin.