



D-O-K (BIODYNAMIC-BIOORGANIC-CONVENTIONAL): RESULTS FROM 21 YEAR OLD FIELD EXPERIMENT.

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Introduction

The land area of organic agriculture in Europe has increased considerably in the last years and organic agriculture is investigated intensively in many fields of research. Earlier the organic farming movement was created by pioneers, whose ideas and innovations formed an alternative to the so-called „green revolution“ that came along with pesticide use and synthetic fertilizers. For the first time environmental problems caused by agriculture became evident.

Presentation of the DOK experiment

In 1978 the DOK long-term field experiment was installed at Therwil close to Basel comparing the farming systems „bio-Dynamic“, „bio-Organic“ and „(K)conventional“. In the first years of the trial crop yield and feasibility of organic farming were investigated. Soils were analysed with respect to long-term effects on fertility and were rated in the view of farming effects on the environment. Today the quality of organic products is the main research interest. Long-term trials like the DOK-trial offer unique opportunities for this kind of research. The DOK-trial compares the three systems mentioned above on the basis of the same intensity of organic fertilization (i.e. the same number of animals per area), the same crop rotation and the same soil tillage. Fertilization and plant protection are different and done according to the farming system. A minerally fertilized conventional treatment is mimicking stockless farming and unfertilized plots serve as controls.

Results of the DOK experiment

Crop yields of the organic systems averaged over 21 experimental years at 80% of the conventional ones. The fertilizer input, however, was 34 – 51% lower, indicating an efficient production. The organic farming systems used 20 – 56% less energy to produce a crop unit and per land area this difference was 36 – 53%. In spite of the considerably lower pesticide input the quality of organic products was hardly discernible from conventional analytically and even came off better in food preference trials and picture creating methods.

Maintenance of soil fertility is important for a sustainable land use. In our DOK field plots the organically treated soils were biologically more active than conventional, whereas chemical and physical soil parameters differed less significantly.

	Organic	Conventional
Winter wheat yield	4.7 t/ha	5.6 t/ha
Fertilizer (NH ₄ NO ₃ -equivalent)	122 kg/ha	360 kg/ha
Energy (Diesel-equivalent)	340 l/ha	570 l/ha
Plant protection (active ingredients)	0-200 g/ha	6.0 kg/ha
Soil microbial biomass corresponding to ca.	40 t/ha 700 sheep	24 t/ha 400 sheep

Conclusions

The organic farming systems show an efficient utilization of natural resources and a higher floral and faunal diversity – features typical for mature ecosystems. We therefore conclude that organically manured land use systems with grass-clover in the crop rotation and using organic fertilizers from the farm itself are a realistic alternative to conventional agricultural systems.

Key publications to this subject

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