

## Organic Pilot Farms in North Rhine-Westphalia (Germany)

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### Abstract

*Since 1993, research, advisory service and practice work together in the German Federal State of North Rhine-Westphalia (NRW) on solutions for selected issues of plant cultivation and animal husbandry with practical relevance for organic farmers. The project that is funded by NRW and the European Union entails demonstration and optimisation of selected organically operating farms and their methods of production as well as professional advice. The project is coordinated by the Institute of Organic Agriculture and executed in cooperation with the Chamber of Agriculture and contributes effectively to the expansion of Organic Agriculture (OA) in NRW.*

*In this successful participatory and interdisciplinary cooperation between practice, extension service and research, 30 farms that are distributed all over NRW and integrate a wide range of different types of production in their typical local region are involved in developing the research questions, executing experiments and discussing results. Solutions are assessed and optimised on farm level and demonstrated in the practice of major farms in order to secure the knowledge transfer in extended agricultural practice. The feasibility of the methods is immediately assessed by practitioners and transmitted to colleagues.*

### On-farm research - a transdisciplinary approach

#### *Aims*

The project 'Organic Pilot Farms in North Rhine-Westphalia' was initiated in 1993 by the Ministry of the Environment and Conservation, Agriculture and Consumer Protection in NRW to strengthen and establish OA in NRW. Decentral on-farm research, demonstration, extension and transfer of knowledge are the basis of this project. Agricultural science (University of Bonn), extension service (Chamber of Agriculture) and private organic farms cooperate aiming to increase scientific knowledge and to improve quality of advisory services by creating places for demonstration and discussion on practical farms in the region to transmit scientific results directly into agricultural practice. The technical, ecological and economic feasibility of Organic Farming (OF) systems is demonstrated to enhance the willingness of conventional farmers to convert to OF, an approach that meanwhile is pursued in the Netherlands as well (Brinks 2003).

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### *Concept*

'An increase of inter- and transdisciplinary approaches in agricultural sciences' was already requested in the memorandum 'Research for a Sustainable Agriculture' of the Federal Agency for Nature Conservation (BfN 2001). The memorandum 'Future Perspectives of Agricultural Science and Research' of the German Research Foundation (DFG 2005) is consciously oriented on practicability. An improved exchange between theory and implementation into practical use is recommended. This concept, which has been pursued in the project 'Organic Pilot Farms in North Rhine-Westphalia' for more than one decade, has proved to be serviceable and successful in an evaluation through the German Federal Agricultural Research Centre (FAL) and is international basis in all CGIAR Centres.

The concept is based on private organic farms, so-called 'Pilot Farms', which are distributed all over NRW integrating a wide range of different farm types, from vegetable growers to livestock breeders, in their typical local region. Additionally, they had been selected for innovation and competence in communication, the main issues for daily collaboration. Pilot Farms provide sites for factorial field experiments, supported by demonstration fields in which scientific results are proved and displayed under different regional and climatic conditions and, if necessary, modified for the integration into the individual farm. All decentral scientific trials and demonstration fields are available for regional advisory services of the chambers of agriculture and the organic growing associations. Thus, the Pilot Farms are essential places of exchange for scientists, advisors and practitioners.

The schedule of the project is:

- **Research**

On Pilot Farms factorial field experiments on questions of interest for the practice are conducted by scientists of the University of Bonn and the Chamber of Agriculture NRW, in close cooperation.

- **Knowledge Transfer**

entails conversion and use of scientific results under practical and site specific conditions as well as enhancement to practicable procedures.

- **Demonstration**

The technical, ecological and economic producibility is demonstrated decentral as an advice both for conventional farmers with interest in converting to OF and for farmers already working organically.

Research needs are detected in direct dialogue with the agricultural practice, problems of current interest can be continuously incorporated in scientific work. Pilot Farmers are intensively involved in raising the research questions implementing the experiments as well as discussing the results. This inter- and transdisciplinary approach, which had also been successful and essential in cooperations between science and practical farmers in the United States (Wuest et al. 1999) and in the Netherlands (Langeveld et al. 2005), opens a panel of relevance control for scientists. Research separated from practical interest can be avoided.

Through intensive and long-lasting cooperation between practice, extension and research an efficient work on relevant scopes and a direct knowledge transfer of scientific results into practice are provided immediately. The farmers themselves contribute to spreading knowledge directly from farmer to farmer in their own diction.

### *Communication*

Researchers, advisers and Pilot Farmers meet several times a year (cp. Thompson & Thompson 1990). During the growing season field trials and demonstration plots can be used for advisory services. New strategies are presented and discussed on field inspections that are open for all interested farmers irrespective of their mode of farming. In wintertime results get reviewed with all participants together in project meetings. Details get well thought-out and new demand is mutually ascertained in thematic working groups (arable crops, potatoes, vegetables, dairy cows, poultry, pigs). Research deliverables are published in annual reports of all experiments, on the website [www.leitbetriebe.oekolandbau.nrw.de](http://www.leitbetriebe.oekolandbau.nrw.de) and in practitioner-oriented journals, too.

### **Participatory research and knowledge transfer**

Developing new cultivation strategies is an open, participatory process of all project partners. The following examples give an insight in the chances of transdisciplinary cooperation:

#### *Indirect weed control*

The use of morphological variation of winter wheat (*Triticum aestivum* L.) cultivars as a tool for indirect weed control was applied as a disciplinary project of agronomy. The results substantiated that weed suppression and shading ability through crop cover, crop height and leaf inclination (planophile vs. erectophile leaf inclination) were inversely correlated (Eisele & Köpke 1997). Out of these results an interdisciplinary research group, founded by the German Research Foundation (DFG), was arranged at the University of Bonn. Later on transdisciplinarity became subsequently workable in the EU-Project 'Strategies of Weed Control in Organic Farming, WECOF' and finally the results were presented to farmers in demonstration fields on Pilot Farms (Neuhoff et al. 2005).

#### *Underseeds in potatoes*

To minimise erosion and nitrate leaching the suitability of different underseeds in potatoes (*Solanum tuberosum*) were tested in the late 1990's. These promising approaches had been reviewed very critically by practice until two Pilot Farmers in cooperation with an adviser of the Chamber of Agriculture in NRW started to use this strategy in practice. They reported less weed infestation and better harvest conditions by a reduced amount of clods. With increasing interest these positive statements were followed by their colleagues. An examination of different underseeds under practical site conditions was requested. From 2005 to 2007 in fifteen factorial field trials and in seven demonstration plots distributed all over NRW amongst others *Raphanus sativus*, *Sinapis alba* and *Fagopyrum esculentum* were undersown in potato stands in order to control weed infestation after senescence of potato shoots. Different sowing dates were tested. Weed dry matter as well as the density of *Chenopodium album* were reduced mainly by oil radish and early sowing combined with the last mechanical treatment (ridging). Buckwheat able to suppress weed growth efficiently is suggested to be used in vegetable production (Stumm & Köpke 2007). By presenting the prosperous results in several articles and on conferences, mostly by a researcher together with a convinced Pilot Farmer, underseeds in potatoes became an accepted strategy to reduce weed infestation after senescence of potato shoots in practice.

## Conclusions

The transdisciplinary cooperation in the project 'Organic Pilot Farms in North Rhine-Westphalia' was distinguished on an international conference for its applied operation method and the efficient knowledge transfer (Lange & Lehmann 2005, while scientists can only present conclusive results. As shown in the example *Underseeds in potatoes*, the presentation of results in articles and on conferences by researchers together with a convinced practitioner who demonstrates that he is ready to bear the financial risk of the new method has become a central issue to develop confidence of practical farmers into the feasibility of new strategies.

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