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## **New insights into organic farming in Germany – empirical results of a survey in 218 farms**

Hiltrud Nieberg<sup>1</sup> and Gerold Rahmann<sup>2</sup>

### **Abstract**

A comprehensive description of the recent structure, performance and developments of organic farming in Germany does not exist. Because of this gap the Institute of Organic Farming and the Institute of Farm Economics of the German Federal Agricultural Research Centre (FAL) have carried out an interdisciplinary empirical analysis of the state of the art of Organic Farming in Germany in 2002-2003. In addition to the status-quo-analysis an important function of the study was to establish a long lasting research-organic farming-network. Farm economists, organic crop production specialists, organic livestock specialists and sociologists are member of the scientific network. 218 randomly chosen farms throughout Germany have been surveyed in 2002/2003. The survey was carried out with face-to-face interviews including closed, open-ended and open response-option questions. Up to 15,000 variables per farm have been gathered. In this paper the major findings of the survey are described.

*Keywords: organic farming, nationwide survey, organic crop production, organic livestock husbandry, economic viability, on-farm research, interdisciplinary research*

### **Zusammenfassung**

## **Neue Einblicke in den ökologischen Landbau in Deutschland – Empirische Ergebnisse einer Erhebung von 218 Betrieben**

Ökologisch wirtschaftende Betriebe zeichnen sich durch eine außerordentliche Vielfalt aus. Um diese Vielfalt und Komplexität erfassen und verstehen zu können, reicht es nicht aus, auf Einzelfragen fokussierte und/oder regional begrenzte Forschungsvorhaben durchzuführen. Vor diesem Hintergrund haben das Institut für ökologischen Landbau und das Institut für Betriebswirtschaft der Bundesforschungsanstalt für Landwirtschaft in den Jahren 2002 bis 2003 eine umfassende interdisziplinäre Struktur- und Situationsanalyse des ökologischen Landbaus in Deutschland durchgeführt. Über die Analyse des Status Quo hinaus wurde mit dem Vorhabens die Grundlage für ein längerfristiges Praxis-Forschungs-Netzwerk geschaffen, in dem neben den landwirtschaftlichen Betrieben Wissenschaftler verschiedener Disziplinen - Pflanzenbau, Tierhaltung, Betriebswirtschaft und Soziologie – vertreten sind. Kern der Studie war eine im Winter 2002/2003 durchgeführte bundesweite Erhebung von 218 zufällig gezogenen Ökobetrieben. In mehrstündigen Interviews mit geschlossenen, offenen und halboffenen Fragen wurden wichtige gesamtbetriebliche und produktionsbezogene Basisdaten sowie vielfältige Einschätzungen der Betriebsleiter zu verschiedenen Themen erhoben, insgesamt fast 15000 Variablen. Die ermittelten Informationen ergänzen die vorhandenen Statistiken und ermöglichen einen vertieften Einblick in die Strukturen und

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<sup>1</sup> Institute of Farm Economics, Federal Agricultural Research Centre, Bundesallee 50, D-36118 Braunschweig; hiltrud.nieberg@fal.de

<sup>2</sup> Institute of Organic Farming, Federal Agricultural Research Centre, Trenthorst 32, D-23847 Westerau; gerold.rahmann@fal.de

Produktionsbedingungen ökologisch wirtschaftender Betriebe. In diesem Beitrag werden die wichtigsten Ergebnisse dieser Erhebung vorgestellt.

*Schlüsselwörter: Ökologischer Landbau, bundesweite Betriebserhebung, ökologische Pflanzenproduktion, ökologische Tierproduktion, Wirtschaftlichkeit, „on-farm“ Forschung, interdisziplinäre Forschung*

## **1 Introduction**

Organic farms are marked by extraordinary diversity. This diversity is caused, among other things, by locational factors; the outset situation at the time of conversion; the farm's own course of development in the process from conversion to the establishment of organic farming; the production guidelines from organic farmers organizations; the socio-economic framework conditions, and the abilities, expectations and preferences of the farm manager. The official data from organic farms (from agricultural reports and agricultural census) provide certain basic information on production and structure as well as about costs, returns, and the income situation. But detailed data on individual production practices and husbandry systems, on marketing methods, on farm internal interdependencies, forms of cooperation and the perspectives of the farmers and their families are not included in this data. For this reason, many deeper analyses of importance for policy advice could either not be conducted in a satisfactory manner or not be conducted at all with the available data.

In the past few years, much has been said about organic farming, but discussions with the actors in organic farming themselves have only taken second place. The inclusion of those affected by answering urgent questions in organic farming is, however, of extraordinary significance to better understand the situation in organic farming and to create practically appropriate options for dealing with the subject. People, with all of their desires, resources and abilities, are the essence of a farm. A farm can only be understood as a holistic entity with the people at the centre. Even today, a system oriented analysis of organic farming is lacking which integrates both the technical aspects as well as the socio-economic aspects and considers the holistic needs of organic farming.

For this reason, in 2002 and 2003, an extensive interdisciplinary analysis of the state of the art of organic farming in Germany was undertaken, and at the same time a long term research-organic farming-network established.

In this paper, the most important results of the analysis are compiled and explained.<sup>3</sup> Due to the explorative nature of the study conducted, the emphasis was laid on description, which shall serve as a basis for other research projects.

## **2 Methods**

The study is based on a nation wide survey of 218 randomly chosen organic farms (Figure 1). In the framework of an interdisciplinary survey with face-to-face interviews, the different crop production and husbandry practices, the marketing channels and forms of cooperation as well as important economic and sociological data were detailed surveyed and analysed.

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<sup>3</sup> The complete research report can be downloaded under: <http://www.fal.de/dokumente/fallit/zi036030.pdf>

## Figure 1: Location of the randomly chosen organic farms surveyed

The selection of the farms to be surveyed was made with the help of the organic certification bodies. In the first step, ten percent of about 13,000 organic farms certified according to EC Regulation No. 2092/91 were chosen randomly. Of the randomly chosen 1,279 farms, farms which converted after Dec. 31, 1998 (meaning they were still in the conversion period in 2001); farms with less than one hectare of utilised agricultural area; farms with an emphasis on special crops (vineyards, horticulture), and those with a very specialized area of production such as horse or game husbandry, etc., were excluded from the sample. The remaining data from 717 farms served as the outset sample for the selection of 240 farms to be surveyed. In order to take special regional factors into account, Germany was divided into five regions and for each of these regions the method of proportional division by square root was used to determine the number of farms to be interviewed.

### Box 1: Calculation of the number of farms to be interviewed by region

$$n_h = n \frac{\sqrt{N_h}}{\sum_{k=1}^k \sqrt{N_h}}$$

- n total sample size
- k number of groups, here: number of regions
- $n_h$  sample size by group, here: number of farms to be interviewed in specific region
- h group index, (h = 1, 2, ..., k), here: region
- $N_h$  total number in group, here: number of all organic farms in the specific region

The farms to be surveyed (including substitute farms) in each region were chosen from anonymous data set from the certification bodies by random. The certification bodies contacted the selected farms and requested their participation. The FAL only received the addresses of the farm managers after they agreed to participate.

Face-to-face interviews were conducted on the farms in Winter/Spring 2003. Due to the enormous extent and complexity of the partially standardized questionnaire, each farm was visited twice. The interviews lasted between three and four hours on average (in the case of very diverse farms, significantly longer) and thus were on the limits of what was possible. It must be emphasized here, that most farm managers participated with great interest in the interviews. Apart from bookkeeping results, invoices, receipts and official data on milk production, which were also viewed as part of this survey, the answers to this survey are almost entirely based on the statements of the farmers interviewed and thus must be considered as estimates.

## 3 Results

### 3.1 Structure of the farms surveyed

The 218 randomly selected farms manage **an average of 103 ha UAA** in 2002, of which about 54 ha are used as arable land. This size is the approximate size of the average organic

farm in the German Farm Accounting Data Network (AGRARBERICHT 2003), but departs significantly from the full survey by the GERMAN STATISTICS OFFICE 2001, which calculated an average of 52 ha land UAA. This is partially due the fact that farms of under one hectare UAA were excluded from the study. Another factor is the large regional differences in farm structures. Through the process chosen to select a sample (proportional division by square root) the comparably significantly larger east and north German farms are slightly overrepresented in the group studied, and the south German farms smaller than the average are slightly underrepresented. The smallest surveyed farm has 1.9 ha UAA, the largest 1480 ha UAA (Table 1).

**Table 1: Land use by organic farms in Germany according to the agricultural structure survey 2001 and own survey**

Thirty two percent of the surveyed farmers run their farms **part-time** on a comparably small scale, so that they comprise only seven percent of the surveyed land area. With regard to **farm type** (self-appraisal by the farmers), the following distribution emerges: 40% mixed farms, 39% grazing livestock farms, 19% arable farms (about half without animal husbandry) and 2% intensive livestock (pig/poultry) farms (Table 2).

**Table 2: Farm types and farm size of the surveyed farms in 2002**

The largest portion of the surveyed farms have both arable land and permanent grassland (67%). One quarter of the farms studied can be called as “permanent grassland farms”, about ten percent of the study group as “pure arable farms”. A total of 89% of the studied farms keep livestock. The livestock density is on average 0.80 LU per ha UAA and 1.34 LU per ha main forage area. Dairy cows are kept by 31% of the farms, 45% keep suckler cows, 32% fattening pigs, 31% laying hens and 14% sheep. The average herd sizes are 32 dairy cows, 58 suckler cows, 41 fattening pigs, 239 laying hens and 231 sheep.

### **3.2 Results on organic crop production**

In the surveyed farms, plant production takes many forms. This reflects the various structures of the farms – from purely cash crop farms without animals at one end and mixed farms with 2 LU/ha at the other end. Arable crops are produced by about three quarters of the farms. One quarter of the farms manage exclusively permanent pasture.

The most **important crops** on arable land are cereals. These are cropped by 95 % of all farms and make up an average portion of 52 % of arable land. In one fifth of the farms the portion is even above 60 percent. Also of importance are feed crops (78 % of the farms, 22 % of the arable area), tuber crops such as potatoes (56 % of the farms, 4 % of the area), dried pulses (46 % of the farms, 9 % of the area). 28 percent of the farms grow vegetables on three percent of the arable area. Oil seeds such as rape have no real significance up to now in organic farming due to cropping problems.

The average **yields** in the three year period (2000, 2001, and 2002) were, depending on type of cereal, between 2.1 t/ha (rye at relatively poor soils) and 3.8 t/ha (winter wheat) (see Figure 2). A high variation in yields can be observed. In 2002, a very wet year, an average of seven percent (oats) to 33 percent (winter triticale) less grain could be harvested than usual.

### **Figure 2: Average yields of different cereal types in the surveyed farms**

Due to different levels of set aside land on the farms, the amount of **crop rotation yields** is important to evaluate the yield situation. Crop rotation yields make a better comparison of differently structured farms with different crop rotations possible. A crop rotation yield of more than 2.0 t/ha for all threshed crops was achieved by 47 percent of the farms in the very wet year 2002. The farmers assume between 20 and 30 percent higher crop rotation yields under normal weather conditions.

Due to nitrogen fixation, **legumes** are of special significance for the maintenance and improvement of soil fertility in organic farming. The share of legumes is therefore on average 41 percent of arable land (dried pulses, arable feed cropping, etc.). Animal feed is the most important use of these crops.

A total of 98 percent of the farms practice **fodder production** with legumes. Only 16 percent grow silage maize, five percent pure field grass and four percent whole plant silage. Silage, at 79 percent, is the most important form of conservation. Hay is still made by 34 percent of the farms.

**Catch crops** (intercropping and under sown crops) are practiced by 60 percent of the farms, in Region 3 (Bavaria and Baden Württemberg) even 75 percent of the farms. In farms with catch crop planting, catch crops make up about one third of the arable area.

The most **important problems** identified by the farmers in organic plant production are weed control<sup>4</sup>, nutrient supply, and plant health. Nevertheless these problems are seen by the farmers as manageable. The problems in production technology are assessed less critically than the marketing problems.

Against the background of calls to feed organic livestock 100 percent **organic feed**, farmers have chosen to concentrate on cultivating protein plants. Here, as in the case of oil seeds, a great deal of research is needed.

With regard to **seed origin**, it has been found that in cereal production the use of own seeds is of great significance and the exclusive use of seeds from organic farming presents no problem. Organic breeding and the development of suitable varieties for organic farming are at the top of the “urgent” list of the farmers, particularly with regard to the problematic of genetically engineered plants.

Changes in crop production, either in the past or the future, show a permanent dynamic in the farms. The motivations behind these changes, such as a reaction to reduced or increased sales

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<sup>4</sup> Thistle (mentioned by 60 percent of the farms), couch grass (44 percent) and dock (35 percent) are still the most important problem weeds in arable crop and grassland farming. Increased clover-grass-mixture cropping, digging out, and subsequent stubble field practices, or regular mowing or mulching were most often mentioned to combat the weeds.

possibilities, or farm internal needs, show that the farmers are forced to be very flexible in planning their cropping and managing their farms.

### **3.3 Results on Organic Animal Husbandry**

Organic animal husbandry is very diverse in the studied group (Table 3). Even small or part-time farms contribute to diversity (for example, by keeping rare breeds) and to landscape conservation linked to animals. But profitable production is virtually unrealizable for many farms.

**Table 3: Animal husbandry and average herd sizes 2001/2002 in organic farms**

In **dairy farms**, milk production is as a rule the main focus of the farm (91 % of the 67 dairy farms studied). Just under 50 percent of the farms with dairy cows have herd sizes of between 21 and 50 dairy cows. The average herd performance of dairy cows was about 5698 kg per cow and year for the year 2001/2002. The lowest observed herd performance was at 3333 kg per cow and year, the highest at 8644 kg per cow and year (see also Figure 3).

**Figure 3: Distribution of average milk yields 2001/2002 according to performance classes<sup>1)</sup>**

The diversity of the dairy cow breeds used is large. Some of the farms keep more than one breed of dairy cows. Nonetheless, the high performance breeds dominate in organic farming as well. The most important breeds used are Holstein Friesian (in 45 % of the farms with an average performance of 5924 kg/cow and year), Simmenthal cattle (33 %, 5634 kg/cow and year) as well as brown highland cattle (15 %, 5660 kg/cow and year), German Red Piet (11 %, 5354 kg/cow and year) and Red cattle (9%).

The average age of the dairy cows surveyed is 5.8 years, the first calving takes place at 31 months, the interim calving period is 387 days and the replacement rate is 24 percent.

52 percent of the farmers do not purchase feed for their dairy cows. 74 percent feed exclusively organic feed, but 26 percent additionally utilise conventional feed. The average concentrate use in 2002 was 0.9 t per cow and year. The concentrate use show a very high variation: some farmers feed no concentrates, others a great amount of them. Some farmers attain milk yields of more than 5000 kg milk per cow and year exclusively feeding with hay, silage and pasture – meaning no concentrates at all (Figure 4).

**Figure 4: The connection between milk yield and concentrate consumption**

**Suckler cows** are kept by 97 farms (45% of all farms surveyed), and are the farm emphasis in three quarters of the farms (particularly in part time farms). 61 percent of the farms with suckler cow husbandry keep less than 20 cows, while 12 percent have more than 100 suckler

cows. **Specialized beef fattening farms** have extremely low significance in organic farming. A total of 67 percent of the farms surveyed with fattening beef have ten or less head of bovine animals for meat production on a yearly average.

Only ten percent of the farms studied keep **sows** to produce piglets. The average herd size is just ten sows. The following performance statistics were found: 1.8 litters per sow and year, 15 weaned piglets, a replacement rate of 17 percent.

32 percent of the farmers keep **fattening pigs** with an average annual production of 68 pigs. While many farmers maintain pig fattening as a less income relevant additional farm activity for many reasons (nutrient cycle, direct marketing, etc.), There are only few organic fattening farms (3 %) which serve a larger market with an annual production of more than 500 fattened pigs, and can thus be seen as relatively highly specialized.

A scant third of the farms keep **laying hens**. But egg production is only considered a farm emphasis by three percent of the farmers. Almost all hens are hybrid breeds. The average performance is 240 eggs per hen and year (Range: 140 to 320).

14 percent of the farms keep **sheep** and nine percent even keep **goats**. Mostly the sheep are used for landscape management, with extensive lamb breeding. The average herd size is 231 female sheep. Except in the farms with milk goat keeping, the goats generally do not play a central role in the farms.

As transitional exceptions of the EU Organic Regulations come to an end, in some farms significant adjustments in husbandry practices are needed. The improvement of animal health and organic animal breeding were identified as important issues by the farmers.

### 3.4 Socio-Economic Results

The **main reasons for conversion** were environmental (38%), economic (29%) and political (20 %) motives. Environmental reasons are important for all farmer regardless of the start year of conversion. Political motives were mentioned by farmers who converted after 1995 much less frequently than by those who converted in the 1980s. The economic motives seem to have gained importance over the course of time (Table 4).

#### **Table 4: Reasons for converting to organic farming differentiated according to start year of conversion**

Less than two thirds of those surveyed consider their **reputation in their village and neighbourhood** as high, and 72 percent feel that they are accepted by their conventional colleagues. The image of organic farmers as outsiders in villages appears to have been overcome. Politicians and officials should thus be certain that they no longer cultivate the apparently outdated image of organic farmers as exotic and outsiders.

In an average of all surveyed farms, 2.73 **annual work units** were occupied on each farm. About 50 % of these are family members, the other half are external workers. In the present sample, 33 percent of the farms had employees. Related to this group of farms, the average number of external labourers increases to 3.2 annual work units per farm.

Most farmers (73 percent) estimate their **work load** as high or even as too high. This holds particularly true for farms with livestock. In keeping with this, 20 percent of the farmers said that they did not take a vacation during the past three years. A total of 38 percent of the farmers had taken a maximum of seven vacation days on an average of the last three years. There are signs here, that the factor work is for many farmers only inadequately anchored in the consciousness of the farmers, and thoughts of such things as work optimization get lost in the course of normal daily work. For this reason much attention must be paid by research to this area. Solutions must be developed as to how farms can more optimally use their labour force and how existing obstacles and restrictions can be overcome.

The share of **rented land** as well as rent prices show significant differences between regions. Almost every second farmer would like to increase his land endowment, but the renting possibilities are generally seen as problematic. Farmers forego an expansion of area, most often due to exhausted labour capabilities.

Of 79 farmers with **milk quotas**, about two thirds are striving to increase their quotas. The elimination of milk quotas judge 45 % of the 217 farmers, or 77 % of the active milk producers, as negative, since price and income reductions are expected.

The **professional education** of the farmers interviewed is relatively equally distributed over the classical training paths: vocational training, agricultural college and university degree of agriculture. As a rule, highly qualified farmers run arable and mixed farms as well as farms of more than 50 hectares UAA.

Two thirds of the farmers took part in **additional training** during the past three years. When asked about future needs, the farmers mentioned topics, which deal in depth with different details of production-specific aspects.

Almost three quarters of the farm managers take advantage of **advisory services**. The most important partners are organic farmers associations and official advisory offices, although different consultancy structures can be observed between the different regions. In addition, advice by colleagues was judged to be very meaningful. Despite general satisfaction with the advisory services, about half of the farmers mentioned some problems and additional need for advice.

About half of the farmers found **organic certification** to be positive. Criticism was voiced among other things, about the fact that certification is not strict enough and too complicated. Only 35 percent of the farmers were positive about the general farm inspections.

Half of the farmers currently cooperate with other farms, and 64 percent of those questioned are positively inclined to **cooperation**. The human factor, as well as the problem of not finding the right partner farm for structural or spatial reasons is given by the majority of those farms against building cooperation. Farm cooperation could help to increase competitiveness and to reduce the work load. That is why future research projects should identify promising models of cooperation which have proved successful and to prepare them for further use in wider practice.

A scant quarter of the surveyed farms **process** parts of their own products. The additional value created on the farm, the production of an attractive product for direct marketing as well



as the independence from third parties are the reasons listed in order of importance for maintaining own processing activities.

A total of 141 farms (65 %) stated that they sell their products directly to consumers. Farm gate sales (45 %) and farm store marketing (37 %) were mentioned most frequently. Other forms of **direct marketing** such as sales at weekly markets (18 %), delivery routes (11 %) or via “green box” subscriptions (6 %) play a lesser role. The farmers see a possibility for maintaining a certain level of autonomy with direct marketing and to fight shifts in market prices.

Marketing is characterized by the use of a number of different **channels of distribution** which have varying regional significance. Direct sales are of less importance for plant products (except potatoes) in comparison to animal products. Particularly noteworthy is the predominantly lower price level in the study areas in East Germany. Generally the marketing situation is estimated as positive. Only the current and future market situation for milk are judged mostly to be negative.

The various levels of the **gross margins** between successful and less successful farms and thus the profitability of the individual production practices (example wheat: Table 5; example milk: Table 6) are determined mostly by the selected marketing channel. The range between the farms indicates an existing potential for improvement – also in production technology.

**Table 5: Gross margin of organic winter wheat production, 2002**

**Table 6: Gross margin of organic dairy production, 2001/2002**

Both the current and future economic situations of all organic farms in Germany are assessed by every second farmer as negative, while more than 60 percent of the farmers assess their own economic situation as positive (see Figure 5). This contradiction can be explained with various reasons. It can be assumed, that it is easier for some farmers to present their own farms as successful in an interview situation as to point to possible deficits in farm management. Others could have been behaving strategically in order to avoid making the impression that organic farms are overall (too) economically successful. It can be assumed that neither the economic situation of all organic farms can be so bad nor that the individual farms can be so good, as the answers of the farmers make it sound. In comparison with similarly structured organic or conventional farms, many farmers see themselves as being in a better or at least similarly good economic position. Almost 50 percent of the farmers assume that they would have realized lower profits if they had continued to farm conventionally.

**Figure 5: Farmers perception of the economic situation of organic farms in general and their own farm in the future**

In addition to agricultural production, many farms make use of the possibility to earn **additional income**. Here contract labour (75 farms), other enterprises related to agriculture (77 farms) or non-agricultural work (117 farms) were named.

A total of 62 percent of the farmers have received **organic payments** since they began organic farming. More than half of these farmers said that they would have converted even without support payments. 60 percent of the farmers judged the significance of organic payments as very important for the economic viability of their farms. A further 21 percent consider the support important. The level of support is, as is to be expected, highest in Bavaria, Baden-Württemberg and North Rhine Westfalia, and much lower in Mecklenburg Vorpommern and Schleswig Holstein. The current level of payments for the maintenance of organic farming is perceived as adequate by 56 percent of the farmers, while 40 percent find it to be too low. Another four percent consider it to be more than adequate.

Only 15 percent of the farmers have thought at least once about a **reconverting to conventional farming**. The remaining 85 percent do not question the organic approach of their farms. In keeping with this statement, 95 percent of the farmers say they are either satisfied or very satisfied with their occupation as farmer.

A little more than half of the surveyed farmers are between 40 and 50 years of age. Due to the age structure, many have still not clarified the question of a **successor**. Within the group of farmers who are older than 50 years of age, more than half still had no successor. In the few farms where a successor could be named, it was the son.

The impact of the ongoing **Eastern Enlargement of the EU** is judged as negative with regard to agriculture, or rather organic farming, in Germany by 75 percent of the farmers. But 48 % of the farmers expect no impact on their own farms.

For the **year 2010** most farmers expect moderate increase of organically managed land area in Germany up to between four and six percent of UAA. The realization of the politically established goal of “20 percent by 2010” is not expected by the farmers.

## **Outlook**

The data analysed in the framework of this study add to the available statistics and make a deeper view into the structures and production conditions of organic farms possible. The previous results animate to further analyses. In addition to the static analysis of the state of the art of organic farming (Snap Shot Analysis), a continuation of this study is particularly meaningful to observe new developments in organic farming and to evaluate them (dynamic approach). For this reason, a long term research-organic farming-network is being based on the existing study groups, that will be tended by the FAL institutes involved in this study. With the help of this network, concrete research questions shall be studied as close as possible to practice and the database shall be further expanded. In addition, this should serve in the continuous policy advise for organic farming.

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