



TRADE AND AGRICULTURE DIRECTORATE

**THE ROLE OF AGRICULTURE AND
FARM HOUSEHOLD DIVERSIFICATION
IN THE RURAL ECONOMY OF
GERMANY**

Foreword

This report reviews the role of agriculture and farm household diversification in the rural economy of Germany. It was prepared by a consultant, Marie-Luise Rau, Research Assistant at Humboldt University of Berlin, Institute for Agricultural Economics and Social Sciences, Department International Agricultural Trade and Development.

It is one of 13 country reviews prepared under Output area 3.2.1: Agricultural policy reform (Item 3.2) of the programme of work and budget of the Committee for Agriculture for 2007-08.

Based on material compiled from the available literature, these country reviews address all or most of the topics listed below:

- Definitions and underlying concepts of “rural” as they exist at the national level.
- The availability of data pertaining to the share of agriculture and the agro-food sector in the economies of OECD countries at the national level and in rural areas and trends therein.
- The availability of data relating to the income situation of farm households and in particular the availability of information related to non-farming activities.
- The extent to which non-farming income-earning activities of farm households are farm based (*i.e* using farm resources as in the case of farm tourism) or rural based (located in rural areas).
- The extent to which the industries upstream and downstream from primary agriculture are located in rural areas.
- The strength of multiplier effects between farm/farm based and up/downstream industries and rural economies.

The information in these country reviews was used as background to the report "The role of agriculture and farm household diversification in the rural economy: evidence and initial policy implications" [TAD/CA/APM/WP(2009)1/FINAL], which was declassified by the Working Party on Agricultural Policies and Markets in February 2009.

TABLE OF CONTENTS

Definition and typology of rural area in Germany.....	4
Data sources for agriculture and rural areas in Germany.....	7
Overview of the importance of rural areas in Germany.....	8
Agricultural land use in rural areas in Germany	9
Agricultural employment in rural areas in Germany	11
Gross value added in rural areas in Germany	12
Importance of agri-food industries in rural areas.....	14
Alternative income-generating activities of farm households in rural areas.....	15
Role of agri-tourism in rural areas in Germany	19
Role of renewable energy in rural areas.....	21
Challenges of diversification in rural areas.....	22
Multiplier effects of agricultural activities in rural areas in Germany	22
Conclusion	23
References	24
Appendix	27

THE ROLE OF AGRICULTURE AND FARM HOUSEHOLD DIVERSIFICATION IN THE RURAL ECONOMY OF GERMANY

Rural areas are often associated with agriculture. This linkage has been made for many reasons, one of the more important being that rural areas are typically less populated than other areas and thus relatively abundant in open spaces where agricultural production can take place. While the potential for agricultural land use in rural areas seems to be obvious, little is known about the role of agriculture in rural areas. Research studies applying qualitative and quantitative analysis are rare in Germany. The few existing studies are typically case studies focusing on specific rural areas and generalising their results is thus difficult.

This study aims to shed light on the role of agriculture in rural areas in Germany. In addition to land use, the economic importance of agriculture in rural areas is evaluated by looking at employment and gross value added generated by agricultural activities. Apart from employment and income, agriculture is nowadays widely held to have key functions related to the environment, cultural characteristics, and the quality of life in general, and particularly so in rural areas. These multiple functions of agriculture are difficult to measure and not specifically considered in this study. For a framework to analyse the multifunctional role of agriculture see, for example OECD (2001).

The study is organised as follows. First, an overview of the definition and typology of rural areas in Germany as well as of possible data sources for analysing agriculture in rural areas is provided. Given the available information, the respective data from the GENESIS database is matched with the district classification of rural areas by the Federal Office for Building and Regional Planning (*Bundesamt für Bauwesen und Raumordnung*, BBR), and subsequently analysed with regard to the aforementioned indicators. Continuously declining farm incomes have led farmers to take up alternative income-generating activities and these are also looked at in the study. The study ends with a short review of existing case studies that analyse the role of agriculture in rural areas by taking into account the linkages of agriculture with other sector of the economy.

Definition and typology of rural areas in Germany

In Germany, there are multiple definitions of rural areas. While the BBR defines rural areas at the national level, the 16 *Länders* may use their own definition. The definitions of rural areas by the *Länder* are usually based on the rural development plans and policies that are assigned to it within the federal system. As such, these definitions vary considerably. On the one hand, definitions of rural areas are greatly influenced by local needs and initiatives that are deemed to contribute to rural development in the *Länder*. On the other hand, they tend to fit the very policy environment so as to realise their respective rural development programmes most effectively.

For the analysis and comparison of geographic areas with similar structures, the BBR offers a classification system based on settlement patterns and involves a combination of two equally important criteria. The first criterion constitutes population density and the second criterion refers to whether the respective areas have one or more centres that may serve as nodes for economic and social activities. It should be noted that the BBR's classification framework does not intend to categorise areas according to potential structural problems (BBR, 2005). The BBR differentiates between the following territorial categories as the three basic types of regions in Germany:

- **Type 1 regions:** Agglomerations with important centres of >300 000 inhabitants or a population density > 300 inhabitants/km²

- **Type 2 regions:** Urbanised regions with important centres of >100 000 inhabitants or a population density > 150 inhabitants/km²
- **Type 3 regions:** Rural regions without important centres of >100 000 inhabitants and a population density > 100 inhabitants/km² as well as with important centres of >100 000 inhabitants and a population density < 100 inhabitants/km²

Due to their individual structural heterogeneity these types of region can be further divided into so-called differentiated regions. Once again, the differentiating criteria are the level of population and centrality referring to the location of the area to be classified. Under the classification of differentiated regions, each agglomeration (type 1) and urbanised region (type 2) also includes rural areas. While the third type of region is rural by definition, rural regions are divided into more or less densely populated rural areas. With this more detailed classification, the BBR attempts to account for functional relationships within different areas of regions and to create regional units for comparative analysis. Such comparable regional units may extend beyond the administrative units and borders of the *Länder*.¹

The administrative units of *Kreise* are the most commonly used basis in the more detailed classification of the aforementioned regions. In the following paragraphs *Kreise* are referred to as districts that coincide with the NUTS 3 level of the EU's administrative classification system. Similar to the classification of differentiated regions, different types of districts are respectively assigned to the broader types of basic regions; for the precise criteria see table A1 in the appendix. In comparison with other possible classifications, the classification by district has two advantages. First, districts are generally smaller units than areas and can hence capture the structural heterogeneity of the German regions relatively better. Secondly, the district typology allows to directly link the regional classification to the data collected at the district level.²

Figure 1 illustrates the classification by districts (NUTS 3 level), including the three types of basic regions. As shown in the map, rural districts within the basic type of rural regions (type 3 regions) are predominately found in peripheral areas, particularly in and around East Germany. Supplementing this classification of districts with other criteria, Milbert (2005) finds that these districts face particularly difficult structural problems. Other pockets of rural districts are scattered around urbanised centres and agglomerations in type 2 and type 1 regions.

For specific questions, one or the other classification seems to be more suitable. The broader classification of the three basic types of regions lends itself to a more general analysis. For example, the situation and development specific to these region types can be investigated. In contrast, the classifications by type of areas or districts account for the potentially complex urban-rural linkages within regions and thus allow for both inter- and intra-regional analysis. This more detailed differentiation seems to be particularly important in Germany where regions exhibit a great degree of spatial heterogeneity. Most importantly, the smaller the classification units, the more representative the analysis can be.

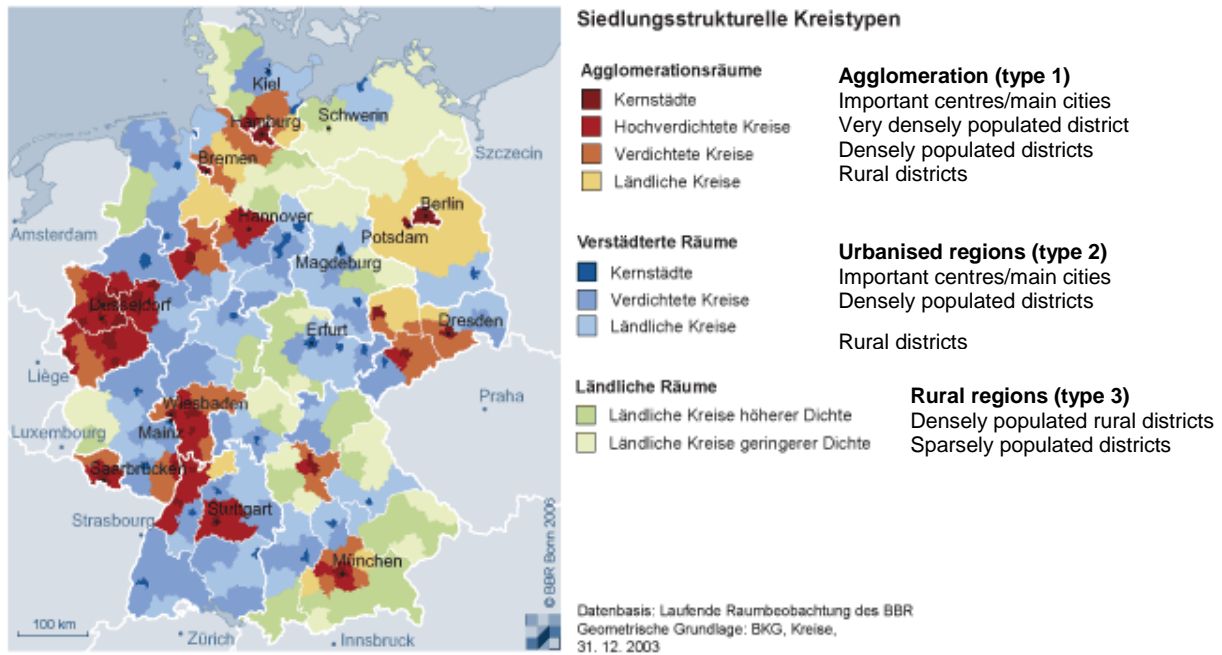
The classification system of areas by the BBR has been specifically developed for Germany and is thus only applied in studies on German regions and areas. Next to the availability of data, the purpose of the analysis determines the choice of the classification used. When comparing areas across different

1. This particularly refers to Berlin, Bremen and Hamburg (Stadtstaaten).

2. There is also an analogous classification based on *Gemeinden* (municipalities) that constitute the lowest administrative unit in Germany, referring to the EU's NUTS 4 level/local administrative unit 1 (LAU 1) and NUTS 5 level/local administrative level 2 (LAU 2). For a detailed description of this classification see www.bbr.de/raumbeobachtung; unfortunately, the web page is only available in German at the moment.

countries, international classification systems are generally more suitable. The Wye Group handbook published in 2007 gives a good overview of different definitions and typologies of rural areas at the international level. Amongst the international classifications, only the OECD classification has been widely recognised and thus most frequently used for comparing rural areas in Germany and other countries. Comparative studies at the EU level also apply the OECD classification (*e.g.* European Commission, 2007).

Figure 1. Map of structural classification at district level (NUTS 3)



Source: Federal Office for Building and Regional Planning, INKAR database 2003.

This study aims to analyse the role of agriculture in rural areas in Germany. As this requires a detailed analysis, the BBR classification seems appropriate; the OECD classification is used only for the general overview of the importance of rural areas in Germany to allow for international comparison. In the more detailed analysis on agriculture, rural areas in the vicinity of urban or semi-urban areas should be included as the agri-food sector could be particularly relevant there. Thus the BBR's detailed classification by districts is applied, and the available data at the district level is matched with different types of districts. In order to manage the data load, the German districts are grouped into four types of districts that serve as analytical units. As suggested by the BBR, the following four types of districts are distinguished:

- **Cities/urban districts:** important centres/main cities within agglomerations (type 1 regions) and urbanised regions (type 2 regions)
- **Urbanised districts:** very densely and densely populated districts within agglomerations (type 1 regions) and urbanised regions (type 2 regions)
- **Rural surroundings:** rural districts within agglomerations (type 1 regions) and urbanised regions (type 2 regions)
- **Rural districts:** densely and sparsely populated rural districts within rural regions (type 3 regions)

When analysing agriculture in rural areas in Germany, it is relevant to consider the differences between rural areas. In general, the role of agriculture in rural areas can be expected to differ between the north and south as well as between the east and west. Possible differences, however, appear to be particularly significant between east and west Germany, and thus the analysis in this study attempts to account for east and west Germany separately.

This study relates to the most recent year for which data is available and, if possible, also reports on developments and trends over time. As included in the analysis, it should be noted that the comparison over time is somewhat tenuous because the assigned district types may change over time. For example, districts defined as urbanised in earlier years may fall under the district type of cities due to population growth. These dynamics are difficult to identify and not corrected for in this study. The respective results thus have to be interpreted with particular care.

Data sources for agriculture and rural areas in Germany

At the national level, the Federal Statistical Office (*Destatis*) provides statistics for Germany in total, including information for the 16 German *Länder*. Data at the more detailed level is generally available in regional statistics published by the statistical offices of the *Länder*. As for the other EU member states, both national and regional statistics for Germany are also available from Eurostat. While Eurostat tends to be a comprehensive source of data at the national level (NUTS 1 level), the Eurostat regional statistics for Germany mainly refer to the NUTS 2 level and thus aggregate the detailed data of the German districts (NUTS 3 level) to groups of districts under the German administrative system.

The statistical offices of the *Länder* are responsible for the detailed regional statistics at the district and municipality level. As collecting regional statistics from the individual statistical offices of the *Länder* is time-intensive and tedious, there has been a concerted effort by *Destatis* and the statistical offices of the *Länder* to bring the data together into one database. This database is called GENESIS and contains the most comprehensive data compilation at the regional level and covers the time period 1995-2004/5; longer time series may also be purchased upon special request. Being readily available online, the GENESIS database serves as the main data source in this study.

The aforementioned data sources provide data information and possibly calculated indicators. They cover all economic sectors, generally differentiating between the primary, secondary and tertiary sector. Depending on the statistics, national data may contain more detailed information classified according to the NACE system. However, such information is unavailable for detailed regional data. While the processing of agri-food products generally falls under the category of manufacturing *i.e.* the secondary sector, primary agricultural production tends to be listed separately. Details of the primary production of agriculture and farm characteristics are available in the annual agricultural reports published by the Federal Ministry of Food, Agriculture and Consumer Protection (BMELV). Here, information about the *Länder* is not included but can be obtained from the individual agricultural reports by the respective ministries of the *Länder*. Data on the agri-food industry is only provided at the national level and annually published in the statistical yearbooks on food, agriculture and forestry of the BMELV.

Neither national statistics nor regional statistics by the *Länder* specifically account for rural areas. Rural areas may be mentioned in the respective reports by the agricultural ministries, but systematic documentation is missing. Whatever classification of rural areas may be adopted, the determining factor for analysing different German areas in detail is the availability of statistics for regional units.

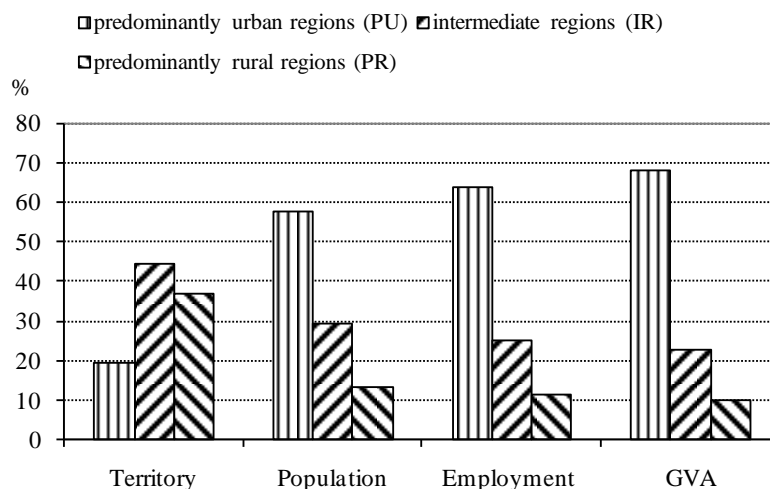
For the general analysis of areas, the BBR developed the INKAR (in German: Indikatoren und Karten zur Raum- und Stadtentwicklung) database that generates indicators and maps of regional development. Based on the available regional data, the INKAR database calculates a variety of indicators

for German areas according to the BBR's classification system. While including indicators for land use and agriculture, the main focus of the INKAR database is on indicators for regional development (e.g. infrastructure, population and employment). The most current version of the INKAR database relates to the year 2004, but changes in the respective indicators are also provided to allow for a comparative analyse with regard to a specific reference year. While in principle very convenient, the INKAR database was not used for several reasons, most importantly because it provides neither time series nor absolute values of the raw data.

Overview of the importance of rural areas in Germany

In order to give an overview of the importance of rural areas, the following indicators are examined: their share in territory, population, employment and gross value added (GVA). Figure 2 illustrates these indicators for Germany based on the OECD regional classification at the district level. As mentioned above, the OECD classification has been used to allow for comparison with other countries. Data for GVA and employment relates to 2002, and data for land coverage and population to 2003. As shown, urban regions (PU) made up for 19.4% of the total land territory in 2003. Predominantly intermediate regions (IR) covered 44.1%. In comparison, predominantly rural regions (PR) had a relatively high share of 36.5% and it was only with regard to land coverage that rural areas seem to be somewhat important. However, urban regions and predominantly intermediate regions together cover more than 70% of the land territory, and thus Germany as a whole can hardly be considered as rural.

Figure 2. Share of rural area in territory, population, employment and GVA in 2003 (2002)*



* The data generally relates to the German district level (NUTS 3).

Source: European Commission (2006).

The great majority of people (57.5%) lived in predominantly urban regions, followed by intermediated regions (29.3%). Only 13.2% of people lived in rural regions (PR). In recent years there has been a continuing trend of depopulation of rural areas, particularly in East Germany. For a detailed investigation on population changes and their implications in German rural areas see, for example OECD (2007). Similar to population patterns, the importance of predominately rural areas in terms of employment and GVA was marginal. As illustrated in Figure 2, they respectively accounted for 11.3% and 9.2% of national employment and GVA. These particularly low shares for rural areas were significantly smaller than for the other two types of regions according to the OECD classification.

Since the OECD classification is rather broad, many German areas defined as rural by the BBR do not qualify as rural areas according to the OECD typology, and this leads to different results. OECD (2007) compares the different results for rural areas in Germany under the two classification systems. If the detailed BBR classification by districts is used the importance of rural areas is much more pronounced. That is rural areas score higher shares in of land territory (59%), population (27%) and GDP (21%). As argued above, the following more detailed analysis of the role of agriculture in rural areas in Germany applies the BBR classification by districts, despite the loss of international comparability.

Agricultural land use in rural areas in Germany

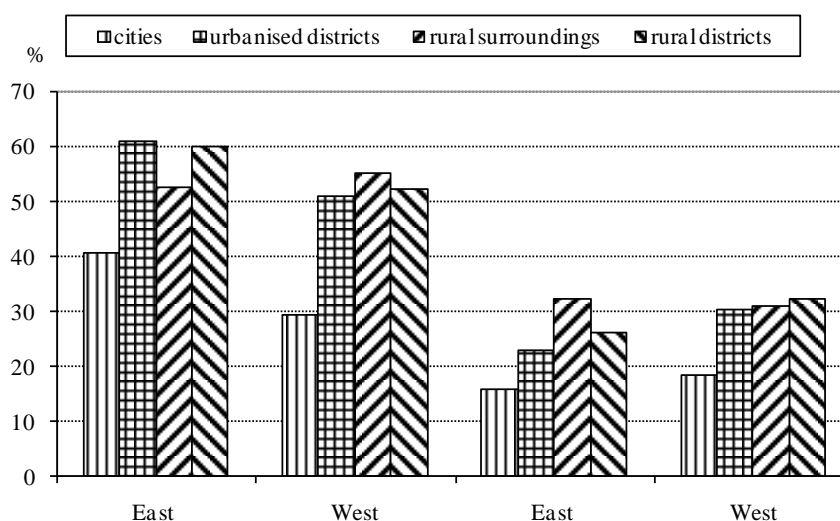
In 2004, more than half of the entire land territory (53 %) was under agricultural cultivation. Only 30% of the German land territory was covered by woodland. While these rather large shares indicate the general importance of agriculture and forestry in land use for Germany as a whole, the following paragraphs focus on land use patterns by matching the available district data with the BBR classification as described above (compare section about definition and typology of rural areas).

For the year 2004, Figure 3 illustrates the share of agriculturally cultivated and wooded areas in the four district types (cities, urbanised districts, rural surroundings and rural districts) in East and West Germany. Irrespective of district type, the share of land under agricultural cultivation was generally larger in East than in West Germany. The opposite holds for woodland that covered relatively more land area in West Germany. In rural districts as well as rural surroundings, the majority of land was agriculturally cultivated. In West Germany, the highest share of agricultural land (55%) is found in rural surroundings, followed by rural and urbanised districts. While a relatively large area was under agricultural cultivation in rural surroundings (52%), agricultural land use in East Germany was more prominent in rural districts (60%).

Agricultural land use was not only significant in rural districts. In urbanised districts, surprisingly high shares of land are in agricultural use. In urbanised districts in East Germany, for example, about 61% of the area was under agricultural cultivation, the overall highest share. While certainly resulting from the rather broad definition of agriculture land in the statistics³, the high proportion of agricultural land use may point out two potentially important functions of agriculture there. First, despite advanced logistics agriculture in urbanised districts (as well as rural surroundings) may still supply people living in adjacent centres of cities or towns with food products, mainly fresh and perishable products. Secondly, agriculture creates landscapes, and may therefore contribute to the environmental quality as well as recreational possibilities in the vicinity to cities and town. With respectively 30% and 40% in West and East Germany, the share of agricultural land use was considerably lower in cities.

3. In the statistics, the definition of agricultural land includes areas of horticultural production (*e.g.* orchards and greenhouses).

Figure 3. Share of agricultural land and wooded areas according to district types, 2004



Source: GENESIS database combined with district classification.

Throughout the time period 1996-2004, the data shows an increasing trend in woodland and a decreasing trend in the area under agricultural cultivation.⁴ In rural districts and surroundings, the decrease in agricultural land (up to -2.2% in West Germany) and the increase in woodland (up to 2.1 % in East Germany) was relatively modest. Agricultural land in urbanised and urban areas fell somewhat more, presumably giving way to other land uses such as housing.

While the area of agricultural land only marginally changed over time, the number of farms significantly decreased. The change in the number of farms between 1999 and 2003 is presented in Table A2 in the appendix. It is distinguished between the different district types as well as part-time and fulltime agricultural holdings (see section on alternative income-generating activities for the definition in Germany). Both the number of part-time and fulltime agricultural holdings fell in all district types, except for rural surroundings and districts in East Germany. Here, the number of full-time agricultural holdings rose, whereby the increase in rural districts (6.3%) was larger than in rural surroundings (1.2%), and the number of part-time farmers decreased. Possibly due to the relatively high proportion of smaller family farms, the decline of the number of farms was more pronounced in West Germany than in East Germany, in relative and absolute terms. The number of part-time farms fell particularly sharply. Given that part-time farmers more frequently engage in off-farm activities to sustain their income, this observation could indicate that farmers find the step between part-time farming and ceasing production generally easier to take.

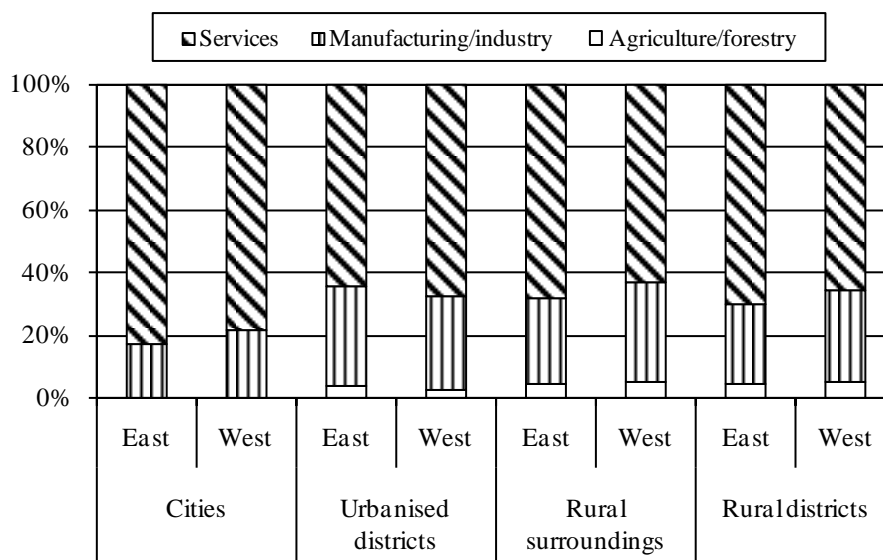
4. This data is not included in the study but can be provided upon request.

Agricultural employment in rural areas in Germany

According to a study by the European Commission (2007), employment patterns in rural and urban areas have generally become more similar. This also holds in Germany where in all district types the lion share of persons are employed⁵ in the tertiary sector of services, followed by the secondary sector. Average agricultural employment in Germany accounted for only 2.2% in 2005. However, looking at the different district types, agriculture and forestry was more important for employment in rural districts and surroundings. Its share in employment there amounted to a maximum of about 4.5%.⁶

For East and West Germany, Figure 4 illustrates the employment pattern by district type. On average, employment in agriculture and forestry was of little importance in comparison to other employment opportunities. While agricultural employment in cities was negligible, the highest share of persons employed in agriculture and forestry (4.7 %) is observed in rural surroundings in West Germany. In rural districts and surroundings, relatively more persons worked in agriculture and forestry in West Germany where generally more and smaller farms/family farms are located. Family members engaged in agricultural activities are included in the database. With regard to Germany as a whole, about 61% of farm family members worked on the farm in 2005. However, the number of family members has been decreasing, more than the number of other persons employed (BMELV, 2006a). For details about changes in the employment status of persons working in agriculture in Germany see Fasterding and Rixen (2006).

Figure 4. Share of persons employed in the different sectors according to district types, 2005



Source: GENESIS database combined with district classification.

In order to elaborate the development of employment in agriculture and forestry over time, the respective growth rates are looked at. The first part of table 1 presents the growth rates (as well as the absolute changes in brackets) between 1997 and 2005 by district types. Irrespective of district type,

-
5. Here, persons employed in agriculture refer to all persons engaged in agricultural activities at a certain reference week. They do not necessarily need to be employees but must receive some kind of reimbursement.
 6. The data is not included in the study but can be provided upon request

agricultural employment significantly decreased. In Germany as a whole, the share of persons working in agriculture particularly fell in rural districts and surroundings, respectively -13.6% and -15%. This decrease was larger than the national average of -10.7% and may be explained by the relatively large number of agricultural persons in these areas. For the time period 1994-2004, OECD (2007) approximates an annual growth rate in agricultural employment of -3.3%.

Distinguishing between East and West Germany, the data reveals considerable differences in the development of agricultural employment. First, the relative decrease in agricultural employment was much more pronounced in East than in West Germany. While the decrease for all district types was about -7% in West Germany, agricultural employment dramatically fell by about -22% in East Germany. Except for rural areas and cities, less agricultural persons (in absolute numbers) however lost their jobs in East Germany, implying a comparatively smaller agriculture workforce there. Secondly, the types of districts most affected by the decrease in agricultural employment were different in East and West Germany. In relative terms, cities and urbanised districts in East Germany show the most significant decrease, up to almost 30%. In contrast, the relative agricultural employment in rural surroundings and districts in East Germany fell comparatively less (about -20%) but, in absolute numbers, more people lost their employment in primary agricultural production. In rural surroundings in West Germany, the biggest loss is observed despite the comparatively modest decrease in relative terms. Both in relative and absolute terms, the change in agricultural employment is surprisingly small in rural districts in West Germany.

Table 1. Growth rate of agricultural employment and productivity by district type, 1997-2005

	Agricultural employment (absolute difference in 1000 persons)			Agricultural labour productivity	
	Germany total	East	West	East	West
Cities	-4.7% (-2.5)	-29.7% (-3.0)	-0.5% (-0.5)	2.95%	-0.06%
Urbanised districts	-6.6% (-27.1)	-25.8% (-13.4)	-3.8% (-13.7)	4.97%	-2.17%
Rural surroundings	-15.0% (-34.9)	-20.3% (-16.6)	-12.2% (-18.3)	7.96%	3.19%
Rural districts	-13.6% (-34.9)	-19.9% (-14.1)	-11.0% (-8.7)	8.77%	3.70%
All district types	-10.7% (-99.2)	-21.9% (-47.1)	-6.9% (-50.2)	7.56%	4.35%

Source: GENESIS database combined with district classification.

For the time period between 1997 and 2005, the second part of table 1 presents the growth of agricultural labour productivity measured as value added per person employed. For all district types, labour productivity in agriculture grew considerably faster in East than in West Germany, and this observation seems to reflect the continuing structural changes in the agricultural sector in East Germany. However, it should be noted that for agriculture the value added per person employed was generally lower than in the other sectors of the economy, both in East and West Germany. In East Germany, the difference was considerably less pronounced than in West Germany.⁷

7. The data is not included in the study but can be provided upon request

Gross value added in rural areas in Germany

As in other industrialised countries, the tertiary and secondary sector of the economy contributes most to the gross domestic product (GDP) in Germany, both in the West and East. The share of agriculture and forestry in GDP is generally low. In 2005, the gross value added (GVA) of agricultural primary production and forestry contributed only 1% of national GDP (BMELV, 2006a). Table 2 presents the respective shares of agriculture and forestry, manufacturing (secondary sector) and services (tertiary sector) in 2005, according to district type. Even in rural districts and surroundings, agriculture generated very little value added in comparison to the other economic sectors of the economy. For Germany as a whole, the share of agriculture and forestry in GDP amounted to 2.3% in rural districts and surroundings in 2005 and was hence above the national average. When distinguishing between East and West Germany, the highest share is observed in rural districts in East Germany (2.8%). This is not surprising as in East Germany agriculture has been rather competitive with the comparatively large farms reaping scale economies. Average farm size in East Germany was 199 ha and thus much higher in comparison to 32 ha per farm in West Germany (BMELV, 2006a).

Table 2. Share of different sectors in GVA by district type, East and West Germany, 2005

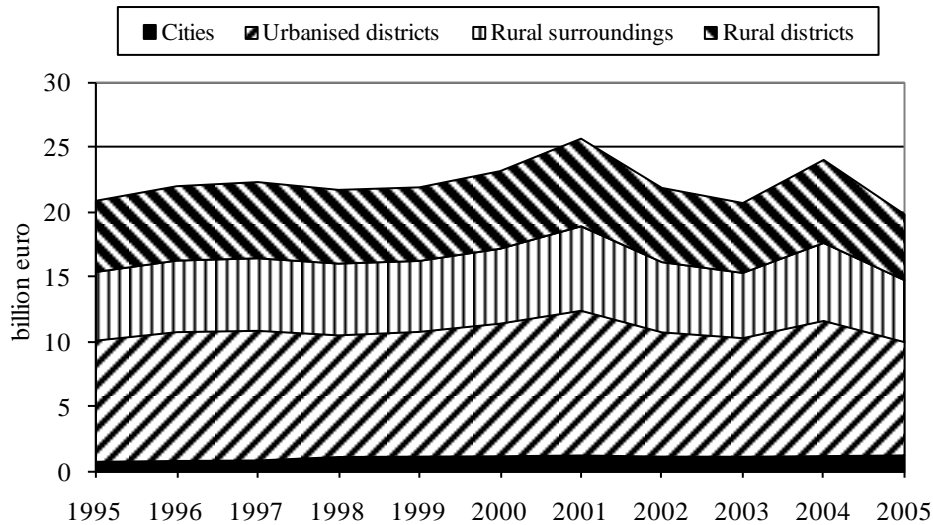
	Agriculture and forestry			Manufacturing/ industry			Services		
	Total	East	West	Total	East	West	Total	East	West
Cities	0.2%	0.2%	0.2%	26.0%	20.7%	26.5%	73.8%	79.1%	73.3%
Urbanised districts	1.1%	1.7%	1.1%	32.9%	31.8%	33.0%	66.0%	66.5%	65.9%
Rural surroundings	2.3%	2.2%	2.3%	32.5%	28.8%	34.4%	65.2%	69.0%	63.3%
Rural districts	2.3%	2.8%	2.1%	30.6%	27.1%	31.8%	67.1%	70.2%	66.1%

Source: GENESIS database combined with district classification.

With regard to Germany as a whole, Figure 5 illustrates how the GVA of agriculture and forestry evolved throughout the time period 1995-2005. Again, it is differentiated between district types. After a slight initial increase, a decreasing trend can be observed since 2001. With agricultural value added changing only marginally, cities constituted an exception from the overall trend. Throughout the ten years, the highest level of agricultural value added is observed in urbanised areas, possibly reflecting the production of high value agricultural crops *e.g.* horticultural products. In rural districts and surroundings, the GVA of agriculture was about the same and decreased more.

In order to better evaluate how agricultural GVA changed in the different district types over time it seems to be useful to look at the respective growth rates. The percentage changes of the GVA in agriculture, manufacturing as well as services between 1995 and 2005 are presented in Table A3 in the appendix. As expected, the contribution of agriculture and forestry decreased in all district types, except cities. This decrease was particularly prominent in East Germany. While the GVA of both manufacturing and services grew in all district types, it is interesting that the largest increase is observed for services in rural surroundings (42.9%) and rural districts (36.4%) in East Germany.

Figure 5. Development of GVA in agriculture/forestry by district types, billion EUR, Germany total



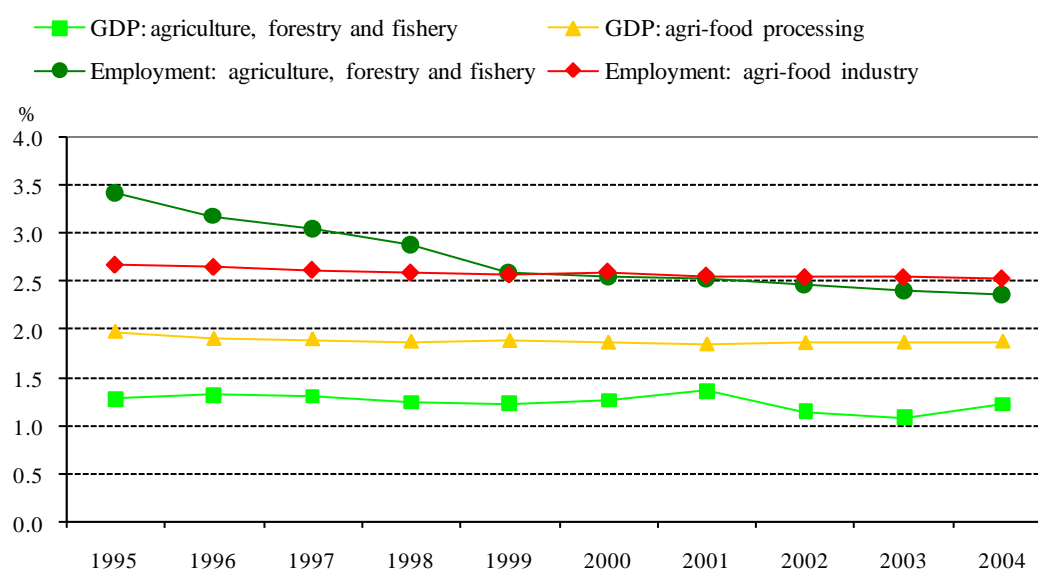
Source: GENESIS database combined with district classification.

Importance of agri-food industries in rural areas

For agri-food industries, data is only available at the national level (compare section about data sources). With regional data information missing, it is impossible to directly analyse the importance of agri-food industries in rural areas. However, some inferences may be made when looking at the agri-food sector as a whole.

Figure 6 illustrates the share of the agri-food processing industry in total employment and in GDP in Germany, and includes the agricultural primary sector and forestry for comparison. As shown, throughout 1995-2004 agri-food processing consistently accounted for almost 2% of national GDP, thereby exceeding the contribution of primary agricultural production. With regard to employment the situation over time was different. While accommodating around 2.5% of total persons employed each year, the share of the agri-food industry was initially below that of primary agricultural production. With the sharp decline in agricultural employment, the agri-food industry has been offering employment to somewhat more people from 1999 onwards.

Figure 6. Share in employment and GDP of agri-food processing and agriculture, 1995-2004



Source: Statistical Yearbook on Food, Agriculture and Forestry, BMELV (2006b).

Over time, the data reveals a slightly decreasing trend in both indicators for the agri-food processing industry. From 2000 onwards, the raw data, however, show a small increase in its contribution towards national GDP. As can be easily made out in figure 6, the relative changes in the agri-food industry were rather small, particularly in comparison to primary agricultural production. With jobs in agriculture rapidly decreasing in rural areas, employment possibilities in agri-food processing tend to be particularly relevant there. In rural areas, agri-food processing may be attractive to agricultural persons that look for employment outside the shrinking primary production and could serve as both an alternative and an additional income source. The following section elaborates on alternative income-generating activities taken up by agricultural persons.

Alternative income-generating activities of farm households in rural areas

In the public debate, alternative income-generating activities are commonly referred to as diversification. While not clear-cut, the term diversification is often used interchangeably with pluriactivity. From the perspective of farm households, pluriactivity results in a combination of farming and other activities undertaken both on-farm and off-farm. Alternative on-farm and off-farm activities can take many forms, and Loy and Ratheman (2006) classify them according to their factor inputs. Following their classification, Table 4 gives an overview of the portfolio of alternative activities farm households may undertake to generate additional income. While the classification presented includes activities of primary agricultural production, it can be argued that such typical agricultural activities do not really diversify income sources of farming households. These activities are more appropriately described as production diversification, instead of income diversification.

Farm households may take up a variety of alternative activities as an additional income source. For example, organic production is often combined with direct marketing and farm tourism. While some combination of additional income-generating activities go together, others seem to conflict or may even hinder each other. Since all activities farm households are engaged in compete for resources, resource availability obviously limits the uptake of additional income-generating activities. While larger farms

commonly have capital and land resources, labour can be considered as the surplus factor for smaller farms, and alternative income-generating activities tend to be chosen accordingly (Davidova and Chaplin, 2006). This study does not specifically consider alternative income combinations and mainly focuses on activities (on-farm non agricultural and off-farm activities) that do not involve primary agricultural production.

Table 4. Alternative income-generating activities of farm households

Production factors		
Labour	Specific agricultural inputs	Others
<i>On-farm agricultural activities/ primary production:</i>		Returns on capital
Special agricultural products (e.g. herbs, rare breeds)		Income from renting
Organic production (animal and crop production)		
Energy crops		
<hr/>		
<i>On-farm non-agricultural activities:</i>		
Energy generation (wind, biogas and wood)		
Aquaculture		
Handicraft (furniture)		
Processing of agricultural products (meat processing, cheese and wine making)		
Direct marketing (farm shops, farmers' market)		
Services using agricultural production factors (horse boarding, nature conservation, landscape management, contracting work)		
Tourism (accommodation, restaurants, recreational activities)		
<hr/>		
<i>Off-farm activities:</i>		
Self-employed		
Employment outside agriculture		

Source: based on Loy and Rathmann (2006).

Data about alternative income-generating activities is generally difficult to obtain. For analysing the importance of the respective activities of farm households income statistics seem to be most appropriate. Income statistics of the main occupations of farm households (fulltime as well as part-time) in Germany are published by the Federal Office of Statistics (up to 1993). For recent years, the agricultural reports by the BMELV provide information but only for part-time farm households at the national level. Next to income statistics, official information from the production point of view is readily available. Both national and regional statistics in Germany contain data for specific branches and activities (e.g. organic farming, renewable energy and tourism). As in the case for tourism for example, there is often no direct link with agriculture, and the share contributed by alternative income-generating activities of agricultural holdings whether situated in rural or other areas is generally not provided.

The farm structure survey (FSS) conducted every two years is another important source for representative data about agricultural holdings.⁸ In addition to other information, the FSS contains the number of part-time and fulltime agricultural holdings. Information on the number of part-time and

8. For details about the survey methods see www.forschungsdatenzentrum.de.

fulltime enterprises can generally be considered to be a first indicator of the importance of alternative income-generating activities. However, this depends on the definition of part-time and fulltime. While part-time and fulltime agricultural holdings in Germany used to be defined according to their main income source until 1995 (fulltime: 100% income from agricultural production activities), the differentiation between part-time and fulltime is now based on the persons employed (full-time enterprises: 1.5 persons employed, part-time enterprises: <0.75 persons employed); only for enterprises employing between 0.75 and 1.5 persons, the criteria of income source is applied (part-time enterprises: <50% income from agricultural production). As such, both part-time and fulltime agricultural holdings in Germany engage in alternative income-generating activities, and the number of these different kinds of farms does not allow for conclusions about income diversification.

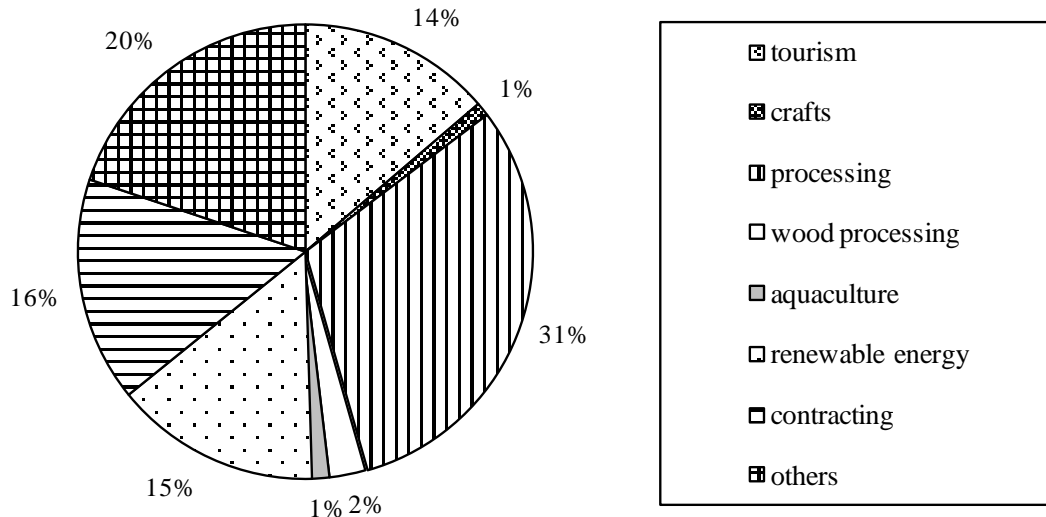
For the first time in 2003, the FSS collected information about the characteristics as well as the number of agricultural holdings undertaking a variety of alternative income-generating activities, excluding off-farm activities. As results from the FSS can only be used with special permission, this study relies on the national results publicly available through Eurostat. Evaluating the national Eurostat data gives an idea about the importance of different alternative income-generating activities for German agricultural holdings. Without detailed regional data, the analysis with regard to rural areas is not possible.

In 2005, the FSS results report 87 870 agricultural holdings with income diversification (excluding off-farm activities), equalling about 25% of all agricultural holdings in Germany. This is a surprisingly small proportion, possibly because off-farm activities are not included. According to BMELV (2006a), nearly 80% of all agricultural holdings in Germany undertook at least two activities (both on-farm and off-farm) to sustain their income. With regard to the time period 2000-2002, a OECD study on farm household income finds that an average of about 35-40% of German agricultural holdings with income diversification had income from off-farm activities (OECD, 2003). Off-farm activities can generally be considered as more important for part-time than for fulltime enterprises.

Figure 7 illustrates the importance of various alternative on-farm activities in 2005. The shares presented relate to the number of holdings with income diversification. As combinations of alternative activities are possible, the number of holdings undertaking the respective activities is greater than the number of holdings with income diversification. As shown, most agricultural holdings diversified into on-farm processing of food products (including direct marketing) (30%), followed by other not specified on-farm activities (horse boarding, fur animals) (20%). Note that on-farm food processing includes direct marketing. With regard to direct marketing, farm shops, farmers' markets and sales to restaurants are particularly important in both West and East Germany (Recke *et al.*, 2004). While initially mainly organic food products were directly sold to customers, the direct marketing of conventional food products has become increasingly popular in Germany. Respectively about 15% of the diversified agricultural holdings took up contracting (landscape and nature management, harvesting, building, transportation), renewable energy and tourism. Other alternative on-farm activities were much less popular, at around 1%.

How did the uptake of these alternative on-farm activities evolve over time? As presented in Table A4 in the appendix, the number of holdings with alternative on-farm activities rose by 13.3% between 2003 and 2005. The number of holdings increased for all activities, except for contracting (-about 4%). Both in relative and absolute terms, renewable energy and non-specified other activities increased most. While alternative on-farm activities generally became more important, the proportions of the different activities changed. Although the proportion of holdings engaged in agri-food processing decreased (-3.6%) between the two years, agri-food processing remained the most frequent alternative income source in 2005. While tourism and contracting as alternative income sources became less popular, the popularity of renewable energy increased and can be expected to do so in the future.

Figure 7. Share of different on-farm activities for farms with income diversification, Germany, 2005



Source: Eurostat Farm structure survey (FSS).

The FSS does not provide information about the income generated by the respective activities, neither at the national nor at the more detailed regional level. Without specifically relating to rural areas, a few studies investigate the income contribution of alternative on-farm and off-farm activities as well as the time spent on them. While some apply accounting methods based on known cost positions and assumptions, others rely on surveys in which agricultural holdings in specific regions or all over Germany are asked about their income and time effort for the respective activities. In a study commissioned by the BMELV, Recke *et al.* (2004) conducted an in-depth survey with 200 agricultural holdings engaged in direct marketing in both East and West Germany. The results show that for the holdings interviewed, mainly fulltime enterprises, direct marketing activities on average yielded 53% of their income in 2002. It should be noted that the income contribution varied greatly; important influencing factors were volume and the type of direct marketing.

Lemmerbrock (1999) as well as Loy and Rathmann (2006) focus on alternative income sources for farmers in the *Land* Schleswig-Holstein in the North of Germany. Neither study specifically relates to rural areas; Schleswig-Holstein is defined as an intermediate region (IR) according to the OECD classification. Lemmerbrock (1999) looks in detail at the following four alternative income sources: horse boarding, Christmas tree production, farm holidays and golf courses. For each of these activities, she calculates the possible income for agricultural holdings and includes possible effects on up-stream sectors so as to evaluate the economic importance of the respective activities in Schleswig-Holstein. The other study by Loy and Rathmann (2006) is more recent and thus more interesting for the purpose of this study. After evaluating the FSS results for Schleswig-Holstein, the authors conduct an additional survey about the income and employment effects of alternative activities, both on-farm and off-farm. For holdings with income diversification, they find interestingly that in 2006 any alternative on-farm activity included in the FSS generated substantial less income than traditional agricultural activities. On average, the share of alternative on-farm activities accounted for only 19% of the total income of the farmers interviewed. The

share of purely agricultural activities was 65% and thus much higher, but farmers also spent considerably more time on farming.

The only study explicitly relating to alternative income-generating activities of agricultural holdings in rural areas is Seifert and Fink-Kessler (2007). The authors attempt to evaluate the income and employment effects of farm diversification in the region *Hohenlohe* in Baden-Württemberg (in south-west Germany). The region *Hohenlohe* consists of two districts both of which are defined as rural surroundings according to the BBR classification. In a detailed survey, 66 farmers engaged in processing, direct-marketing, agri-tourism and renewable energy (biogas) or combinations of these activities were interviewed, and survey results show that the employment possibilities on the respective diversified farms increased by about 20%. In the time period 1995-2004, the number of persons employed per farm rose from 2.46 to 3.1 (fulltime labour equivalent). Income effects were not quantified, but the majority of farmers interviewed claimed that income had increased due to their diversification. Since the various alternative activities helped the predominantly small farms (family farms) to sustain their income and thus stay in business, other businesses could develop in the region and thus farm diversification had a positive impact on the entire region *Hohenlohe*. In the study, the authors concentrate on the processing of animal products that plays a particularly important role in the region and specifically consider the processing of high-quality regional specialities. No representative information about the employment and income effects in the region are provided.

In many cases, women play a considerable role in the development of alternative income-generating activities. As reported in a EU study on employment in rural areas of the member states, it is often the farm wife who initiates and engages in on-farm alternative activities (European Commission, 2007). In Germany direct marketing and work related to agri-tourism are important activities of farm women. According to the survey by Recke *et al.* (2004), farm women have key responsibilities in the organisation of direct marketing and selling products directly to consumers, respectively 44% and 61%. However, an increasing number of women tend to take up off-farm work in order to contribute to farm household income. Fahning (2001) finds that in the *Land* Niedersachsen (IR) the activities of farm women (both on-farm and off-farm) on average generated 33% of total farm income. For more recent information about the role of farm women in rural areas, see for example Scherb (2007).

Role of agri-tourism in rural areas in Germany

Tourism has traditionally been important as an alternative income source for farm households. Although often praised as a panacea for the generally difficult economic situation in rural areas, the success of agri-tourism in rural areas depends on a variety of factors. Most importantly, natural characteristics such as scenery, landscape as well as cultural heritage determine whether areas appeal to tourist and holiday-makers and are thus important conditions for agri-tourism. Only 55 of the 193 rural districts are in areas that could be attractive for tourist purposes, mainly in the South or in the coastal areas in the North of Germany (OECD, 2007). The results of a recent study about agri-tourism show that these areas have been the most popular destination for farm holidays (Grimm *et al.*, 2006).

Several recent studies (*e.g.* Quack *et al.*, 2007, PLANCO consulting, 2006, Lorenz Tourismusberatung, 2006, Grimm *et al.*, 2006) analyse the situation of tourism in rural areas and agri-tourism. Some of them particularly attempt to evaluate the potential of tourism/agri-tourism in specific regions and formulate recommendation for improvements. It is interesting to note that the aforementioned studies were all commissioned by ministries or governmental institutions. For the BMELV, Grimm *et al.* (2006) for example undertake a detailed demand analysis for agri-tourism in Germany. Based on a comprehensive survey, the authors find that the consumers' main interest in agri-tourism is to have a variety of leisure activities outside in the countryside. Most consumers who decide to go on farm holidays want to explore the region, enjoy nature and experience farm life. According to the study, the latter has

been particularly important for families who are most interested in farm holidays. These results highlight the potential of the traditional form of agri-tourism that has been very successful in some rural areas, particularly in West Germany. However, traditional farm holidays can be expected to be less successful and are indeed not really an option in rural areas characterised by intensive agricultural production and large farms.

For many rural areas in East Germany, for example, where agricultural holdings are much larger than in the rest of the country, agri-tourism seems to be more appropriately described as land tourism. As opposed to farm tourism, land tourism implies that holiday makers do not necessarily get in close contact with the agricultural activities of their host. Since land tourism is not directly linked to the farming environment, its concept is broader than farm tourism, and farmers typically play a different part (Quack *et al.*, 2007). In the extreme case, farmers do not provide accommodation but other leisure activities and services. Most importantly, they maintain village structures, landscape features as well as environmental amenities that make rural areas attractive for day trips and holidays.

Generally, tourism is more prominent in rural areas in West than in East Germany. Based on tourist statistics, PLANCO consulting (2006) report that in 2003 the number of overnight stays in rural areas was about three times larger in West than in East Germany. Whether these nights were spent within farm/land holidays cannot be determined due to the lack of data, but further results by PLANCO consulting interestingly state that in East Germany the share of overnight stays in rural areas was rather high (above 50 %), most probably due to the relatively few overnight stays in total. Overnight stays in rural areas in Mecklenburg-Vorpommern (IR) and Brandenburg (IR) in the East of Germany were particularly popular and this could result from the considerable effort in tourist marketing there. In both East and West Germany, the bed capacity in rural areas was however only partly utilised in 2003, respectively about 32% and 35%.

There has been a decreasing trend in the number of persons having farm/land holidays. Between 2001 and 2005, the number of persons having farm/land holidays fell considerably by about 36%, and fewer people were generally interested in farm/land holidays (about -21%) (Grimm *et al.*, 2006). One reason for the decline of farm/land holidays in Germany, but most probably also in other countries, is certainly the more and increasingly diverse offer of other holiday arrangements, for example specific holiday packages, cruises and cheap flights. In addition, Grimm *et al.* (2006) report that considerably less middle and low income families in Germany go on holidays, but they are the main customers at least for farm holidays. In 2005, about 1.6 million people (including children) took land/farm holidays. Assuming EUR 575 per holiday and person, farm/land tourism in Germany generated a turnover of about EUR 943 million (Grimm *et al.*, 2006).

For rural areas in Germany, OECD (2007) approximates an employment rate in tourism of 3.4% in 2003. When differentiating between district types according to the BBR classification, 4.7% of persons employed earn their living from tourism. This constitutes a relatively high share in comparison to cities and urban areas where the employment rates respectively were 2.9% and 2.4 %. No differentiation between East and West Germany is made, and it remains unclear if the tourism activities include agri-tourism. Employment opportunities in agri-tourism generally seem to be limited; as mentioned above, agri-tourism typically creates work for family members, particularly for farm women. However, if other services relevant for agri-tourism (*e.g.* shops, restaurants, leisure activities, tourist attractions) are included agri-tourism and thus agriculture could have a positive effect on the employment situation in rural areas.

Role of renewable energy in rural areas

In recent years, renewable energy has emerged as a very attractive alternative income source for agricultural holdings (compare FSS results above). Activities related to renewable energy take many forms, and agricultural holdings in Germany have been engaged in different stages in the process of generating energy from renewable resources. On the one hand, farmers' activities comprise the production and delivery of organic matter (both animal and plant origin) for conversion into energy. On the other hand, farmers may own or share facilities to generate bio fuels, wind or solar energy. Being more or less directly involved in the generation of renewable energy and coordination activities (planning, buying and selling), farmers can diversify their income sources to other sectors outside agricultural production. Farmers engaged in renewable energy move away from agricultural production towards services, as many local and regional examples in Germany show; see, for example, Hemmers (2006).

Although activities related to renewable energy are widely discussed in the context of rural development, surprisingly few studies conduct quantitative analyses about the importance of renewable energy in rural areas. Most of them do not specifically refer to rural areas. Existing studies (*e.g.* Breuer, and Holm-Müller, 2006, Gottschick 2006, Breuer and Holm-Müller, 2005, Schnaut, 2005) commonly apply accounting methods to approximate the profitability of producing specific energy crops and generating renewable energy. These calculations identify various factors influencing the potential of renewable energy as an alternative farm activity, for example the kind of biomass used for conversion (traditional crops, specific energy crop and waste material), the energy-generating technology as well as characteristics of the agricultural holding (size, management system).

With regard to the potential of renewable energy in rural areas, location is emphasised as a key factor. Costs for farmers engaged in renewable energy increase with the distance to the market, *i.e.* the distance between the location where the energy crop is produced and respective energy-generating facilities as well as between energy-generating facilities and consumers. In Germany liquid bio fuels, for example, are currently mainly refined in centralised plants situated close by industrial areas that are easily accessible (Plieninger, 2006). Depending on the input, farmers in rural areas may deliver their products for conversion into energy but they then often compete with imports from other countries. In a study about bio fuels generated by rape seed, Breuer and Holm-Mueller (2006) therefore support the construction of decentralised refineries that have economic effects (income and employment) in rural areas rather than elsewhere. Estimates of the possible benefit for both farmers and the rural economy are not provided.

Furthermore, biogas plants are often constructed on the farm premises and convert manure, crop residues or crops into energy. In the case of using by-products or waste of agricultural production as the input, farmers yield additional income, as well as solving the problem of costly disposal. In addition to a variety of issues related to biogas, the location of the farm owning a biogas plant is crucial for ensuring additional deliveries of inputs as well as for supplying the surplus energy to consumers. Since rural areas often lack the necessary infrastructure, the potential of renewable energy in remote rural areas seems to be limited at the moment.

Considering the substantial decline in agricultural employment in rural areas, the number of jobs that may be created within the field of renewable energy may be overstated. On this basis, it could be argued that activities relating to renewable energy are currently more important in terms of their positive contribution in reducing greenhouse gas emissions than their employment effects in rural areas. However, this may change depending on the future advances of the respective technologies as well as the demand for renewable energy. The total consumption of renewable energy amounted to only 5% in 2006, trend increasing.

Challenges of diversification in rural areas

The challenges of income diversification for agricultural holdings are difficult to generalise because they have a strong regional character or lie in the characteristics of the farm and farm household. Recently, the Sächsische Landesanstalt für Landwirtschaft (2007) has started the dialogue with agricultural holdings as well as experts and identified the following challenges of income diversification:

- Weak entrepreneurial skills, insufficient knowledge about the new activity, mentality.
- Insufficient human and physical capital.
- Lack of market demand; information about market demand and changes.
- Other local competitors.
- Networks, cooperation with administration and other producers.
- Legal constraints, regulations and controls.

In general, it can be considered that agricultural holdings in rural areas also face these challenges. However, some challenges may be more acute in rural areas than elsewhere. When taking up alternative income sources, agricultural holdings in rural areas may be particularly confronted with challenges related to location. With regard to renewable energy as an alternative income-generating activity, the previous section mentions the problem of the distance to markets. Similar problems seem relevant for direct marketing activities. While consumers may not find their way to remote farm shops, neither are consumers of the respective agri-food products or other non-agricultural products easily reachable. While selling opportunities are limited in rural areas, this means that changes in consumer preferences and trends are more difficult to identify. Even if situated in a favourable location to centres or cities, there must of course be consumers that demand and are willing to pay for the respective products to ensure the sustainability of the direct marketing activity.

For other activities, location may not constitute a challenge. For example, a remote location must not necessarily be a limiting factor for agri-tourism: Remoteness can be a considerable attraction for visitors and holiday makers, particularly if combined with specific natural characteristic such as mountains or lakes (OECD, 1994). However, remote rural areas often lack infrastructure and other services (shops, post-office, restaurants...) and this may be disadvantageous for agri-tourism. According to the Sächsische Landesanstalt für Landwirtschaft (2007), agri-tourism in general and particularly in rural areas requires cooperation and communication between all actors involved which can become very challenging.

Next to the aforementioned examples, other specific challenges of income diversification for farmers in rural areas could be thought of but evidence is missing. Studies explicitly analysing challenges of income diversification in rural areas are not available.

Multiplier effects of agricultural activities in rural areas in Germany

Agriculture is closely integrated with other sectors of the economy. On the one hand, agricultural holdings demand inputs (production inputs, investment goods, and services) for their farming activities, and on the other hand they supply their output either to consumers or to further processing, both commercial and craftsmanship. Through these linkages agriculture affects income and employment in up-stream and down-stream sectors. These effects in the up-stream and down-stream sectors are indirect and in addition to the direct effects for farm households. If income generated by either direct or indirect effects is spent within the region, further economic effects are induced. Due to these multiplier effects, agriculture is often claimed to be a motor for economic development in rural areas, and the possible multiplier effects should be ideally included when analysing the importance of agriculture in rural areas.

Although a variety of methods can be used to account for multiplier effects, input-output tables are generally the most popular tool for such analysis. Regional input-output tables are unavailable, except for some out-dated ones for some *Länder*. Compiling regional input-output tables is time-consuming and costly, particular when data is not readily available and linkages difficult to identify. Despite considerable flaws, input-output tables for regional analyses are often derived from national input-output tables; for a good overview about possible methodological challenges see for example Midmore and Dirks (2003).

For these reasons, regional input-output tables have rarely been used in the analysis of agriculture in rural areas. In the literature search, only three studies are found. An early study applying input-output tables to evaluate the importance of agribusiness, *i.e.* agriculture as well as the up-stream and down-stream sector in German rural areas is by Schäkel (1996). In his detailed analysis for the time period 1970-1990, he constructs market transaction tables for agricultural engineering businesses, agricultural commodity trade and the dairy sector in two German districts.

The main results of the two more recent studies were as follows. Kowatsch and Fock (2005) apply an input-output analysis to quantify the overall employment effects of agriculture in the rural region Mecklenburgische Seenplatte in East Germany. With the help of detailed surveys, the authors first identify the linkages between agriculture (animal and plant production) and the up-/down-stream sectors in the region, thereby accounting for the possible link to firms elsewhere. For 2003, they find that the share of agriculture with all its linkages in the region amounted to 12% of regional GVA and 10% of the persons employed there, and this is considerably more than expected. The other recent study by von Münchhausen *et al.* (2005) examines the importance of organic and conventional agriculture in rural areas; in the following only the results for conventional agriculture are considered. Based on surveys in three rural districts with different structural problems, the authors generate income multipliers respectively amounting to 1.32, 2.38 and 3.0 in 2002/01. The corresponding employment multipliers were 1.44, 1.09, and 1.68. For both income and employment, the multiplier effects of agriculture were not surprisingly highest in the rural district with comparatively more economic activities (Schwäbisch-Hall, South-West Germany). In the rural district characterised by severe structural problems (Nordpommern, North-East Germany), the multiplier effects with regard to income was comparatively high (2.38) but the one for employment was the lowest of all the districts analysed (1.09).

Conclusion

Matching district data with the BBR's classification of district types, this study shows that the importance of agriculture in terms of income and employment has been sharply decreasing in rural areas in Germany, both East and West Germany. Evidence about income and employment possibilities potentially offered by alternative on-farm and off-farm activities in rural areas could not be provided, but some case studies in the literature show that some agricultural holdings in some specific regions successfully diversify their income sources. Accounting for the backward and forward linkages with other sectors of the regional economy, case study results demonstrate that primary production in agriculture was sometimes considerably increasing through its multiplier effects on income and employment. Whether the various case studies refer to unique success stories remains open, it is not possible to generalise the results. Analysing the role of agriculture in rural areas is difficult. In this study numerous problems were encountered. Most importantly, detailed regional data is necessary for appropriately analysing agriculture in rural areas. As such data is not readily available, it is not surprising that existing research only partly, if at all, covers agriculture in rural areas. If data at the necessarily detailed regional level existed a comprehensive analysis of the importance of agriculture in rural areas would be possible.

REFERENCES

- BBR (Federal Office for Building and Regional Planning) (2007), INKAR database 2006, Bonn: Selbstverlag.
- BBR (Federal Office for Building and Regional Planning) (2005), Raumordnungsbericht (in German: Report 2005), Bonn: Selbstverlag.
- BMELV (Federal Ministry for Food, Agriculture and Consumer Protection) (2006a), Agrarbericht (in German: Agricultural report), Bonn, December 2007: www.bmelv-statistik.de.
- BMELV (Federal Ministry for Food, Agriculture and Consumer Protection) (2006b), Statistisches Jahrbuch über Ernährung, Landwirtschaft und Forsten (in German: Statistical Yearbook on Food, Agriculture and Forestry), Münser-Hiltrup: Landwirtschaftsverlag.
- BMELV (Federal Ministry for Food, Agriculture and Consumer Protection) (2005a), Agrarbericht (in German: Agricultural report), Bonn, December 2007: www.bmelv-statistik.de.
- Breuer, T. and K. Holm-Müller (2006), Entwicklungschancen für den ländlichen Raum – Standortfaktoren der Produktion in Deutschland (in German: Development chances in rural areas – factors determining the location production in Germany), Informationen zur Raumentwicklung, no. 1/2.2006, BBR publication, Bonn, pp.55-65.
- Breuer, T. and K. Holm-Müller (2005), Schnellwachsende Baumarten - Chance für zusätzliches Einkommen im ländlichen Raum? (in German: Short Rotation Coppice – chances for more income in rural areas?), discussion paper no.3, Institute for Agricultural Policy, Market Research and Economic Sociology, University of Bonn.
- Davidova, S. and H. Chaplin (2006), “Farm based approaches to income diversification on the road to EU accession“, in Tanic, S. and T. Lonc (eds.), Farm commercialisation and income diversification on the road to EU accession, Proceedings of a FAO workshop, Prague 2.-6.11.2006, FAO Sub-regional Office for Central and Eastern Europe, Budapest, p.11-35, December 2007: www.fao.org/Regional/SEUR/.
- European Commission (2007), Study on employment in rural areas (SERA), final report, Directorate-General for Agriculture and Rural Development, Brussels, December 2007: <http://ec.europa.eu/agriculture/publi/reports/ruralemployment>.
- European Commission (2006), Rural development in the European Union: Statistical and economic information, report, Directorate-General for Agriculture and Rural Development, Brussels, December 2007: www.ec.europa.eu/agriculture/agrista/rurdev2006.
- Fahning, I. (2001), Frauen sind ein Gewinn! Beitrag der Frauen am landwirtschaftlichen Gesamteinkommen (in German: Women are an asset! The contribution of woman to farm household income), study for the Ministry of Food, Agriculture and Forestry in Niedersachsen, Hannover.
- Fasterding, F. und D. Rixen (2006), Arbeitseinsatz in der deutschen Landwirtschaft und Beschäftigungseffekte politischer Maßnahmen (in German: Agricultural labour units in Germany and employment effects of policy measures), Berichte über Landwirtschaft, 84, 2(2006), pp. 243-263.

- Fock, T. and S. Schwertassek (2005), Die Stellung der Landwirtschaft in der Region Mecklenburgische Seenplatte (in German: The role of agriculture in the region Mecklenburgische Seenplatte), working paper no. A 22, University of Applied Sciences Neubrandenburg.
- Gottschick, M. (2006), Biogas – Einkommensalternative fuer Landwirte? (in German: Biogas - alternative income source for farmers?), German-Watch Study, 06-1-11, July 2006.
- Grimm, B., Meinken, I. Winkler, K. and K. Zieseimer (2006), Urlaub auf dem Bauernhof/Urlaub auf dem Lande (in German: Farm holidays/Holiday in rural areas), study for the Federal Ministry for Food, Agriculture and Consumer Protection, Institut für Tourismus und Bäderforschung in Nordeuropa, Kiel.
- Hemmers, R. (2006), Energetische Nutzung der Biomasse – lokale und regionale Beispiele (in German: Energetic utilisation of biomass – local and regional examples), Informationen zur Raumentwicklung, no. 1/2.2006, BBR publication, Bonn, pp. 81-92.
- Plieninger, T., Bens, O. and R. Hüttl (2006), Perspectives of bio energy for agriculture and rural areas, Outlook on Agriculture, Vol. 35, 2, pp.123-127.
- Lemmbrock, H. (1999), Erweiterung der Unternehmensaktivitäten landwirtschaftlicher Betriebe und deren Bedeutung für die Wirtschaftskraft ländlicher Räume in Schleswig-Holstein (in German: Expansion of alternative income-generating activities of agricultural holdings and their significance for the economy in rural areas in Schleswig-Holstein), PhD dissertation, Aachen: Shaker Verlag.
- Lorenz Tourismusberatung (2006), Gesundheit und Landurlaub (in German: health and land tourism), final report for the Verband zur Förderung des ländlichen Raumes im Land Brandenburg e. V. (pro agro e.V.), Berlin.
- Loy, J.P. and M. Rathmann (2006), “Alternative Einkommensquellen landwirtschaftlicher Betriebe in Schleswig-Holstein” (in German: Alternative income sources of agricultural enterprises in Schleswig-Holstein), study for the Ministry for Agriculture, the Environment and Rural Areas in Schleswig-Holstein, Christian-Albrechts-University of Kiel.
- Midmore, P. and J. J. Dirks (2003), The development and use of rapid assessment methods in ex-ante and ex-post evaluation of policy initiatives in the rural economy, working paper, Applied Economic at the School of Management and Business, University of Wales Aberystwyth.
- Milbert, A. (2005), “The change of living conditions in rural areas of Germany”, Geographische Rundschau. International edition, 1(1/2005), p. 23-29
- OECD (2007), Rural Policy Review: Germany, Paris
- OECD (2003), Farm household income: issues and policy response, Paris.
- OECD (2001), Multifunctionality: towards an analytical framework, Paris.
- OECD (1994), Tourism strategies and rural development, OCDE/GD(94)49, Paris.
- PLANCO consulting (2006), Beschäftigungspotenziale des Tourismus in den ländlichen Regionen in den neuen Bundesländern (in German: Potential for employment in tourism in rural areas in the new Länder), final report , final report for the Federal Office for Building and Regional Planning (BBR)

and the Federal Ministry of Transport, Building and Urban Affairs, BBR-online publication no. 2/2006, December 2007: <http://www.bbr.bund.de>.

Quack, H.-D., Hermann, P. and B. Hallerbach (2007), Strategien zur Stärkung des Tourismus in den neuen Ländern unter Berücksichtigung der nationalen und internationalen Wettbewerbssituation (in German: Strategies for promoting tourism in the new Länder with reference to national and international competition), final report for the Federal Office for Building and Regional Planning (BBR) and the Federal Ministry of Transport, Building and Urban Affairs, BBR-online publication no. 20/2007, December 2007: <http://www.bbr.bund.de>.

Recke, G., Zenner, S. and B. Wirthgen (2004), Situation und Perspektiven der Direktvermarktung in der Bundesrepublik Deutschland (in German: Situation and perspectives in direct marketing in Germany), Schriftenreihe des Bundesministeriums für Ernährung, Landwirtschaft und Verbraucherschutz (BMELV), Reihe A, Angewandte Wissenschaft, no. 501. Münser-Hiltrup: Landwirtschaftsverlag.

Sächsische Landesanstalt für Landwirtschaft (2007), Landwirtschaft und Diversifizierung (in German: Agriculture and diversification), First forum for agricultural holdings and experts, Nossen, 27.08.2007.

Schäkel, W. (1996), Die wirtschaftliche Bedeutung des Agrarkomplexes in ländlichen Regionen, untersucht am Beispiel der Landkreise Emsland und Werra-Meißner-Kreis (in German: The economic importance of the agricultural complex in rural areas, examined for the Emsland and the Werra-Meißner-Kreis), Interdisziplinäre Studien zur Entwicklung in ländlichen Räumen. Kiel: Wissenschaftsverlag Vauk.

Scherb, B. (2007), LandFrauen – aktiv für die Gestaltung des ländlichen Raumes (in German: Women in agriculture –actively engaged in rural areas), in Association for Agricultural Sociology (ASG) , Sixty Years ASG, Journal for rural areas, September/October issue, pp-90-98.

Schnaut, G. (2005), Potenziale der energetischen Nutzung von landwirtschaftlicher Biomasse – regionale Voraussetzungen und Entwicklungsmöglichkeiten am Fallbeispiel Hessen (in German: The potential of energetically utilising agricultural biomass – regional conditons and development possibilities in the case of the Land Hessen), Schriftenreihe der Rentenbank, no. 20, pp. 199-234.

Seifert, K. and A. Fink-Keßler (2007), “Arbeit und Einkommen in und durch Landwirtschaft” (in German: Employment in and through agriculture), Schriftenreihe des Bundesministeriums für Ernährung, Landwirtschaft und Verbraucherschutz (BMELV), Reihe A, Angewandte Wissenschaft, no. 519, Filderstadt: Verlagsgesellschaft W.E. Weinmann mbH.

United Nations Economic Commission for Europe (UNECE), Food and Agriculture Organization of the United Nations (FAO), Organisation for Economic Co-operation and Development (OECD), The World Bank and the Statistical Office of the European Communities (Eurostat)(2007), *Rural households' livelihood and well-being statistics on rural development and agriculture household income*, Wye group handbook, New York and Geneva: United Nation Publication.

Von Münchhausen, S., Knickel, K. and K. Gountaras (2005), Beitrag des ökologischen Landbaus zur Entwicklung ländlicher Räume: Fallstudien in verschiedenen Deutschen Regionen (in German: Contribution of organic farming to the development of rural areas: case studies in different regions in Germany), study for die Bundesanstalt für Landwirtschaft und Ernährung, Institut für ländliche Strukturforschung, Johann Wolfgang Goethe-Universität, Frankfurt am Main.

APPENDIX

Table A1. Criteria of district typology in Germany

Region type 1: Agglomerations	
Type 1 district: Important centres/main cities	> 100 000 inhabitants
Type 2 district: Very densely populated district	Population density > 300 inhabitants/km ²
Type 3 district: Densely populated districts	Population density > 150 inhabitants/km ²
Type 4 district: Rural districts	Population density < 150 inhabitants/km ²
Region type 2: Urbanised regions	
Type 5 district: Important centres/main cities	> 100 000 inhabitants
Type 6 district: Densely populated districts	Population density > 150 inhabitants/km ²
Type 7 districts: Rural districts	Population density < 150 inhabitants/km ²
Region type 3: Rural regions	
Type 8 districts: Densely populated rural districts	Population density > 100 inhabitants/km ²
Type 9 districts: Sparsely populated districts	Population density < 100 inhabitants/km ²

Source: BBR(2000), www.bund.bbr.de/raumbeobachtung.

Table A2. Change in number of fulltime and part-time farms, 1999-2003

	Number of farms					
	Germany total		East		West	
	Full time	Part-time	Full time	Part-time	Full time	Part-time
Cities	-266 (-5.8%)	-28 (-0.74%)	-13 (-4.8%)	-13 (-4.4%)	-253 (-5.8%)	-15 (-0.4%)
Urbanised districts	-9 290 (-10.8%)	-13 996 (-11.8%)	-97 (-4.6%)	154 (3.7%)	-9 193 (-10.9%)	-14 150 (-12.3%)
Rural surroundings	-4 897 (-10.5%)	-9 287 (-14.9%)	40 (1.2%)	-296 (-5.0%)	-4 937 (-11.4%)	-8 991 (-15.9%)
Rural districts	-5 497 (-9.6%)	-9 885 (-14.4%)	160 (6.3%)	-329 (-6.1%)	-5 657 (-10.3%)	-9 556 (-15.1%)
All district types	-20 298 (-10.4%)	-33 417 (-13.2%)	90 (1.1%)	-484 (-3.1%)	-20 040 (-10.7%)	-32 712 (-13.7%)

Source: GENESIS database (data from farm structure survey) combined with district classification.

Table A3. Growth rate of the share in GVA by different sectors and district type, 1995-2005

	Agriculture and forestry			Manufacturing/industry			Services		
	Total	East	West	Total	East	West	Total	East	West
Cities	36.4%	-23.9%	47.5%	7.3%	2.0%	7.8%	22.1%	27.5%	21.5%
Urbanised districts	-6.5%	-21.1%	-4.8%	13.4%	8.3%	13.7%	31.6%	35.4%	31.3%
Rural surroundings	-9.7%	-11.6%	-8.8%	11.2%	-0.7%	17.2%	32.6%	42.9%	27.5%
Rural districts	-7.5%	-15.6%	-3.7%	15.7%	15.7%	15.6%	30.1%	36.4%	28.1%
All districts	-5.9%	-15.4%	-3.2%	11.5%	5.4%	12.3%	27.8%	35.2%	26.8%

Source: GENESIS database combined with district classification.

Table A4. Other gainful activities: overview for 2005 and changes 2003-2005, Germany total

	2005 Number of holdings	Change in number of holdings between 2003 and 2005
Tourism	15 200	36 260 (6.21%)
Handicraft	1 130	9 670 (51.88%)
Food processing	34 410	148 560 (11.34%)
Wood processing	2 810	19 270 (29.75%)
Aquaculture	1 530	10 390 (22.53%)
Renewable energy	16 120	466 080 (77.15%)
Contractual work	17 940	-76 260 (-4.38%)
Non specified	22 050	297 100 (43.46%)

Source: FSS, Eurostat.