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## **Danish rural areas: recent experiences and future trends**

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**Abstract:** *Danish rural areas comprise 15% of the population and the bulk of agricultural production. Compared with urban areas, rural areas have generally been lacking a little behind in terms of employment, population and income levels in recent decades. However, seen in a European perspective, the differences are rather small and have to a certain extent been leveled by the Danish welfare system, through transfer of funds from rich to poor regions. Certain remote and vulnerable areas are facing serious problems in stimulating growth. This paper describes the characteristics of Danish rural areas, and highlights the diversity found among these areas as well as differences in future development potentials.*

**Keywords:** *Rural development, rural areas, Denmark.*

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### **Introduction**

Although the Danish landscape presents a very rural impression with 2/3 of the area under agricultural land use, Denmark has avoided many of the problems which normally characterize countries with large rural areas, such as growing differences between strong growth centers and a weak and depopulated periphery. This paradox is partly due to the geographic and demographic characteristics of Denmark. The country is so small, that no location is physically very remote from large population centers, at least seen in a European context. This is an important aspect when examining the development potential of rural areas in Denmark, as far as access to job markets and service facilities is concerned. Due to the relative homogeneity, rural areas in Denmark have more or less experienced the same trends in population, income and job creation as the more urbanized part of the country over the past decades, and the funds allocated to disfavored rural areas are therefore relatively modest compared with other European and Scandinavian countries. Nevertheless, at a local scale, some rural areas have experienced negative growth in population and economic terms and these areas are faced with serious challenges. Moreover, due to the structural changes in the agricultural sector, leading to a reduction in the number of farms in the last decades, there are important questions to examine regarding the future func-

tions and viability of rural areas in Denmark, especially in municipalities dominated by agricultural production.

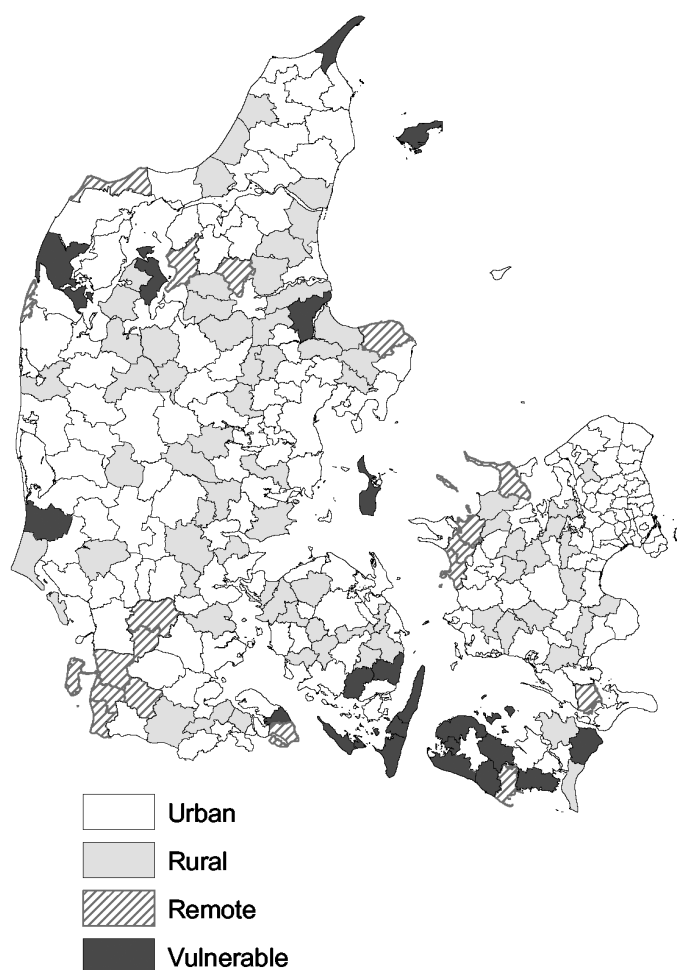
This paper outlines some of the most important characteristics of rural areas in Denmark, and describes the opportunities and challenges they are presently facing as the geography of jobs, population and policies change rapidly in the context of an enlarged European union.

### Rural areas: where and what?

The first challenge one is faced with when analyzing rural areas is the identification of rural areas. There exists no statistical category which clearly identifies rural areas in Denmark and in many other countries (Christoffersen 2002; Indenrigsministeriet 2002; Antrop 2004; Svendsen 2004). Rather, the definitions change at different spatial scales. On a general level, rural areas refer to all areas outside of the main towns in Denmark. Towns and urban areas are defined as an area with more than 200 citizens and with a maximum distance between buildings of 200 meters. This definition implies a certain density criteria in terms of population and residential buildings. Statistically, the municipal unit is used to separate rural areas from urban municipalities. Thus, *rural areas* are defined as municipalities where the main town had less than 3,000 inhabitants in 1994 (Indenrigsministeriet 2002). They include 109 out of 269 municipalities and have a population of 800,000 inhabitants or 15% of the total population (Figure 1). *Remote rural areas* are defined as rural areas located more than 30 km away from regional centers. In addition, small municipalities on islands are included in this definition. All in all, 40 municipalities with a population of 200,000 or 3.6% of the total population are classified as remote rural areas. The most economically *vulnerable municipalities* are rural municipalities which experienced a decline in both employment and population between 1993 and 2000 and which do not host any high growth firms. This group consists of 28 municipalities. Many of these are included in the former group of remote municipalities. Many of the 28 vulnerable municipalities are located on islands, where difficulties of transport and small populations create serious obstacles for development.

### Population

The population in rural areas in Denmark is 796,000 persons or 14.8% of the total Danish population in 2002 (Indenrigsministeriet 2002). The rural population grew by 0.14% per year between 1992 and 2002 as opposed to a growth rate of 0.45% in urban areas. The remote areas did not benefit from this growth rate and these areas experienced a decline in population by 0.12% per year between 1992 and 2002. Thus, while most rural areas experienced a population growth which was positive, although not as strong as in urban areas, a minority of remote and vulnerable areas have a smaller population today compared with 1992 (Indenrigsministeriet 2002).



**Figure 1.** Location of rural, remote and vulnerable areas in Denmark, 2002. See text for definition (after Hasler et al. 2002)

**Table 1.** Population structure in rural and urban areas, 2002 (%)

Age class	Remote areas	Other rural municipalities	All rural municipalities	All urban	Total
0-6	8.1	9.4	8.5	8.5	9
7-16	13.2	14.3	13.6	11.3	11.2
17-25	7.7	8.2	8.1	10.7	10.3
26-45	25.3	26.9	26.8	29.8	29.7
46-64	27.4	26.2	26.6	24.8	24.8
> 65	18.3	15	16.4	14.9	15
All	100	100	100	100	100

Note: after Indenrigsministeriet (2002)

In demographic terms, there is a noticeable difference between rural and urban areas (Table 1). Elderly persons (> 65 years) and children (< 16 years) constitute 38.5% of the population in rural areas but only 35.6% in urban areas. In remote rural areas this proportion is as high as 39.6%. The proportion of „active“ persons is therefore smaller in rural areas compared with urban areas. The higher proportion of children and elderly is caused by a fact that young people move to urban areas for training and education and that a high proportion of jobs are located in urban areas. This disproportion makes it a large financial burden for these municipalities to provide facilities and care for children and elderly.

## Employment

Employment levels rose in both rural and urban municipalities between 1994 and 2001 (Indenrigs- og Sundhedsministeriet 2003b). During this period, rural municipalities in general experienced a growth of 4.7% while employment in urban municipalities grew by 7.2% (Table 2). Also in this respect, remote rural areas stand out in an unfavorable manner. These areas experienced a decline in employment level by 0.4% between 1993 and 2001, amplifying the difficult economic situation of these areas. The changes were the result of a steep decline in employment in primary production in rural areas. Employment in primary production (agriculture, forestry and fishery) traditionally played an important role in the economic life in rural areas. However, the composition of the rural economy has changed significantly in recent decades, as employment in the primary sector declined by 25.6% between 1993 and 2001. Instead, other economic sectors, such as construction, private and public service and manufacture have increased their share of employment in the rural areas by 29.1%, 8.3% and 5.5%, respectively. The most remote rural areas did not benefit from similar development, as increases in employment in these sectors only amounted to 25.3%, 5.1% and -2.5%, respectively. In other words, employment in other sec-

**Table 2.** Change in employment in Denmark, according to branches and location, 1993–2001 (%)

	Remote	Other rural municipalities	All rural municipalities	Other urban	Urban centers	All urban	Total
Primary production	-25.5	-25.7	-25.6	-25.1	-13.0	-24.1	-24.7
Manufacture	-2.5	7.6	5.5	-2.6	-12.5	-5.4	-4.0
Construction	25.3	30.1	29.1	17.5	20.6	18.6	20.0
Services	0.4	13.1	9.7	12.5	19.1	15.6	15.1
Public and private services	5.1	9.4	8.3	7.1	6.7	6.9	7.1
Total	-0.4	6.4	4.7	5.8	9.2	7.2	6.9

Note: Employment is based on place of work. After Indenrigsministeriet (2002).

tors did not compensate for the decline in primary sector employment, and these areas even experienced a reduction in employment in the manufacturing sector. The decline in primary sector employment in the past decades is linked to the restructuring of the agricultural sector in the past decades, which has concentrated production on fewer and larger farms, thereby releasing labor for other sectors (Landbrugsministeriet 1998; Kristensen 1999). As a result of the general growth of employment, the unemployment rate fell from 10% to 4% in both urban and rural areas, with the exception of remote areas.

Agricultural production and the agri-food industry have traditionally played an important role in the Danish economy, and account for 8–10% of GDP and 5% of employment at the national level.

Presently, primary production accounts for 12% of employment in all rural areas, with a slightly greater importance in remote rural areas (see Table 2). Employment in manufacture and construction is also higher in rural areas than in urban areas. Remote rural areas have a slightly smaller share of employment in these sectors than other rural areas. The service sectors generally employ far fewer in rural areas than in urban areas.

The economic effects of the differences in employment rates between urban and rural areas and different types of rural areas is moderated by people commuting between different municipalities for work and by the state-operated transfer of funds between rich and poor municipalities. The figures in Tables 2 and 3 are based on place of work and not the place of residence.

**Table 3.** Share of employment in different branches, according to location, 2001 (%)

	Remote	Other rural municipalities	All rural municipalities	Other urban	Urban centers	All urban	Total
Primary production	14	12	12	4	1	3	4
Manufacture	17	22	21	20	11	16	17
Construction	8	9	9	7	6	7	7
Services	28	26	27	34	46	39	38
Public and private services	33	30	31	35	36	35	35
Total	100	100	100	100	100	100	100

Note: Employment is based on place of work. After Indenrigsministeriet (2002). Column totals may not sum to 100 due to rounding.

## Education level

Skills and education constitutes important resources to generate growth in rural areas (Baldock et al. 2001; Dwyer et al. 2003). For this reason, many develop-

ment programs, such as the EU-funded Leader+ and Objective 2 programs, target education and training in rural areas, in order to stimulate growth. The educational structure in rural areas in 2001 shows a greater proportion of persons with primary school as the highest education. Furthermore, the proportion of persons with high school or higher education is lower in rural areas. The group of persons aged between 20 and 29 generally has the highest educational level, and this group is underrepresented in rural areas, as mentioned above.

**Table 4.** Education level in rural and urban areas in 2001 (%)

	Rural	Urban
Primary school	42	33
High School	4	9
Training	36	34
University	16	21
Other	2	3
All	100	100

Note: after Indenrigsministeriet (2002)

## Income patterns

The average income pattern in rural areas can be described by a number of parameters, such as household income or individual income, gross or net income after taxes. Furthermore, it can be described in terms of the average or the total income in an area, e.g. a municipality (Windelin and Spliid 2003). The choice of method will influence the final results, concerning differences in income levels in different areas. The changes in income levels are analyzed based on both individual gross income (before taxes) and net income (after taxes). The average trend in Denmark between 1992 and 2000 was an increase by 3.66% and 3.21% for individual gross income and net income respectively (Table 5). While rural

**Table 5.** Change in income levels between 1992 and 2002

	All rural municipalities <sup>1</sup>	Agricultural municipalities <sup>2</sup>	Remote areas <sup>3</sup>	Vulnerable municipalities <sup>4</sup>	Country average
Gross income	3.94	4.00	3.52	3.15	3.66
Net Income	3.36	3.42	3.35	3.29	3.21

<sup>1</sup> All municipalities which are classified as non-urban (the main town had less than 3,000 inhabitants in 1994).

<sup>2</sup> All municipalities where agriculture dominates the economy (share >4 times larger than the national average).

<sup>3</sup> All municipalities with low population density and relatively large distance to urban centers.

<sup>4</sup> Rural municipalities which have experienced a prolonged period of population and employment decline. after Madsen et al. (2003)

municipalities in general achieved a growth rate above the national average, the vulnerable municipalities achieved growth rates less than or very close to the national average.

The reason why the net income in the most vulnerable areas actually rose faster than the national average, despite the unfavorable changes in population and employment described above, was a combination of low taxes and increased public welfare spending. In other words, other sources of income, especially those stemming from public welfare, compensated for this decline in income from salaries. These results underline that the Danish welfare system, which evens out regional differences in economic income levels by transfer of funds from well-off areas to disfavored areas, has managed to avoid very uneven development between different regions of the country (Aalbu and Hanell 2003; Groes 2003).

### **From agricultural landscapes to multifunctional rural areas**

Agricultural production plays a large role in rural areas, where 12% of the workforce is employed in agricultural production. Furthermore, most of the Danish countryside is used for agricultural land use. However, agricultural production is very heterogeneous in Denmark, with large regional differences regarding types of production systems. This section gives an overview of the importance and differences in agricultural production in different regions in Denmark.

The area under agricultural land use reached its maximum in 1939, when it covered 76% of the area. More recently, the area has declined by 0.4% every year since 1990 and presently covers 62% of Denmark (Landboforeningerne 2002). Most of the reduction in agricultural area has been caused by urban development or the need for land for recreational purposes (Strukturdirektoratet for Landbrug og Fiskeri 1996). The land use is very intensive in the European perspective, with more than 90% of the area in rotation (Eurostat 1996). Danish agricultural production has been based on mass production of dairy and meat products for export for more than a century (Pedersen 1988). The export value of Danish agricultural products has diminished over the past decades, but it still contributes 14% of the total export value (Table 6). Roughly two-thirds of the production value comes from livestock products while one third comes from plant products. A significant proportion of farm income is derived as EU subsidies. Following the 1992 CAP reform, the Danish farmers receive approximately 700 Million Euro (MEURO) per year. This amount corresponds to 50% of total farm income in 2001 (Landboforeningerne 2002).

The difference in agricultural land use between selected regions of Denmark and the changes between 1989 and 2000 are shown in Table 7. The cultivated area in Denmark declined by 4% between 1989 and 2000. Cereal production dominates crop production in Denmark and covers 65% of the area in Vestsjallands county

**Table 6.** Key figures for Danish agriculture between 1980 and 2000.

	1980	1990	2000
No. of agricultural holdings	114 213	76 978	52 662
Agricultural area, 1,000 hectares	2 884	2 657	2 618
Average size of farm, hectares	25	36	50
Labour input, man-years	130 700	95 000	64 800
Employment (% of active population)	9	3	3
Total arable production, 10 <sup>6</sup> crop units (1 crop unit = 100 kg barley)	1 382	1 820	1 662
Livestock products, MEURO	3 423	4 748	4 774
Arable products, MEURO	957	3 042	2 212
EU Hectarage and headage payments, MEURO	0	0	690
Agricultural exports, MEURO	3 798	6 425	7 451
Agricultural exports ( % of total exports)	28	21	14

Source: Danmarks Statistik 2001; Landboforeningerne 2002.

in eastern Denmark, but only 52% in Ringkøbing county in western Denmark, in both 1989 and 2000. In contrast, the area sown to grass and green fodder crops increased from 16% in 1989 to 22% in 2000 in Ringkøbing County. This is a much larger proportion than in Vestsjællands county and reflects the large concentration of dairy cattle in Western Denmark. The increase in the relative area cultivated with grass and green fodder between 1989 and 2000 in Ringkøbing county is caused by an increase in the area of maize and other crops for silage production. These crops have to a large extent replaced fodder beets as cattle feed, due to the high labor intensity of fodder beet production.

The area under cultivation with root crops has diminished significantly in both counties. The area under root crops on the national level has changed from largely being used for production of fodder beets in 1989 to sugar beets in 2000. In Vestsjællands county 83% of the root crop area is devoted to sugar beet production. In contrast, potatoes constitute a similar proportion of the root crop area in Ringkøbing County, where the sandy soils are suitable for potato production.

The cultivation of seeds for sowing is another type of agricultural land use which shows distinct regional differences in cultivation patterns. This specialty crop (mainly for grass seeds production, such as perennial rye grass) is predominantly cultivated on the better soils in Eastern Denmark. Its share has increased from 5% to 7% of the cultivated area in Vestsjællands county, but accounted for only 1% of the area in Ringkøbing county in both 1989 and 2000.

The changes in land use in Vestsjællands County and Ringkøbing county between 1989 and 2000 demonstrate the differentiated agricultural production in

**Table 7.** Agricultural land use in Denmark and selected regions in 1989 and 2000 (%)

	Denmark		Vestsjællands County		Ringkøbing County	
	1989	2000	1989	2000	1989	2000
Cereals	56	57	64	65	52	52
Pulses	4	1	3	1	6	2
Root crops	7	4	7	5	9	5
Seeds for industrial use	8	4	9	4	8	3
Seeds for sowing	3	3	5	7	1	1
Grass and green fodder (in rotation)	12	16	5	5	16	22
Horticulture	1	1	2	2	0	0
Permanent grassland <sup>1</sup>	8	14	5	11	7	14
Total (%)	100	100	100	100	100	100
Total (ha)	2 774 127	2 646 982	199 461	193 508	312 608	299 549

<sup>1</sup> Values for the year 2000 include mandatory set-aside.

Denmark, which results from differences in the agricultural potential. Crop production in western regions, represented by Ringkøbing county, is closely integrated with dairy cattle production, leading to large areas used for roughage production (grass, fodder beets, maize). In contrast, the favorable soil conditions in eastern Denmark, represented by Vestsjællands County, have led to more specialized plant production, including high value crops such as sugar beets. Pig production is traditionally associated with cereal production as barley constitutes the main feed. At present, the largest concentrations of pig production are found in the vicinity of large towns where meat processing plants are located.

The number of farms declined by over 60% between 1973 and 2000 (from 133,000 to 53,000 farms, respectively). The proportion of full-time farms also declined, from 60% in 1973 to 40% in 2000 (Figure 2). In the same period, average farm size increased from 22 ha to 50 ha and the proportion of farms larger than 50 ha increased from 7% to 32% of all farms (Danmarks Statistik 1975; Danmarks Statistik 2001). These figures emphasize the concentration of production in a smaller number of large farms. Another significant trend during the recent decades is the very uneven distribution of production between farms. Although full-time farms constitute a minority, they still produce the bulk of production. Large, full-time farms which employ more than two full-time workers per year only constitute 24% of all farms in Denmark, but they own 48% of the land, 75% of all cattle and 85% of the sows (Landboforeningerne 2002).

The recent trends indicate a polarization of the farming community between fewer and larger full-time farms, where most of the agricultural production takes place, and a majority of small part-time and hobby farms. A survey among 339 rural land owners in western Denmark showed that 93% of the full-time farmers

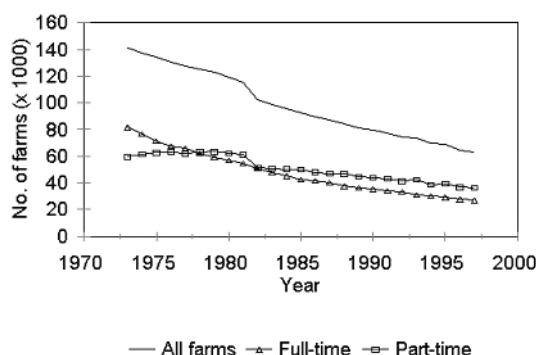


Figure 2. Number of farms in Denmark between 1973 and 1997

originated from rural areas, while this was true for only 80% of the part time farmers (Kristensen et al. 2004). This means that fewer persons living in rural areas have been brought up in the tradition that rural areas are primarily reserved for agricultural production. As a consequence, other objectives than large-scale production and profit-maximization are becoming important in rural areas. These objectives and new services, such as cultural landscape management, nature management, esthetical values, rural tourism, local products, recreation, clean water provision and healthy foods are characteristic of many part-time and hobby farms. The new objectives will have to find their place in the rural areas, and may in some areas bring along new sources of income and diversification outside the declining agricultural sector. This will lead to the emergence of new multifunctional rural areas, where traditional agricultural production increasingly gives way to new activities, in terms of employment effect and economic importance (Jervell and Jolly 2003; Brandt and Vejre 2003).

## Planning in rural areas

The Danish planning system is based on a three-layered model. The state issues planning directives on issues of national importance (major infrastructure projects, power plant location, etc). The 14 counties prepare Regional plans which cover a 12 year planning period and which are updated every 4 years. The 269 municipalities prepare detailed plans for local and urban development. All plans are designed in compliance with the directives and plans issued at the higher levels (Østergård 2002). In order to reduce inequalities between well-off and poor areas, a levelling system distributes government funds to different municipalities based on their economic performance. The benefitting municipalities annually receive between 466 and 1466 Euro per capita. The transfer of funds is quite significant and has been an important tool to avoid large differences between rich and poor areas (Indenrigs- og Sundhedsministeriet 2003a). However, in absolute terms, it appears that the structure of the Danish taxation and social benefits system plays an even large role in redistributing funds between rich and poor areas. Due to progressive taxation levels and increased social ben-

efit rates, rural areas have received significant funds due to the socio-economic situation. In other words, owing to a higher proportion of persons receiving low incomes or social benefits than urban areas, rural areas have received significant indirect payments. This indicates how the Danish welfare system also plays an important role in leveling economic inequalities between rich and poor areas (Christoffersen 2002).

The physical planning in Denmark is based on a zoning principle. Strict rules regulate which activities can take place in three different zones: urban, rural and summer residence zones. As a general rule, rural zones have been reserved for agricultural production, in order to preserve agricultural land and to maintain an open landscape character. The county administration is responsible for most planning activities for rural zones (infrastructure, pollution prevention and nature management, etc.), the allocation of funds for agro-environmental programs handle complaints and process applications for changes in rural zones. The last task was transferred to the municipal administration in 2002.

At present, the planning system which was introduced in 1970 is being reformed and a new planning hierarchy is being designed. The political negotiations are expected to be concluded by 2005, and will bring about a large change in the planning system. Most important are a strengthening of the municipal level, and a likely reduction of the power of regional authorities. The minimum size of municipalities will be increased to 30,000 inhabitants, to secure a sustainable population and economic base. This would lead to a reduction in the number of municipalities and regional authorities. The ambition is to simplify administrative procedures and to bring decision-making closer to the citizens, through the transfer of responsibilities to the municipalities (Regeringen 2004).

The critics of the new reform state that this would endanger a balanced and comprehensive planning procedure, where the needs and potentials in different municipalities are assessed and mediated at a regional level. Regardless of the outcome of the reform, future planning for rural areas will need to develop ways to balance the increased competition for land in areas where agriculture has lost its traditional importance. In these areas, new land uses, mainly for residential or recreational purpose will become important and will increase pressure on local politicians to advance their requirements. In areas where intensive agriculture will continue to be an important land use, environmental issues are likely to impose significant planning priorities. It is important to ensure sustainable production even in intensive agricultural areas, to make them attractive to the increasing proportion of „urbanites“ (Knickel 2002; Jervell and Jolly 2003; Brandt and Vejre 2003). This means that environmental requirements are likely to become stricter, in order to reduce, for instance, ammonia deposits on fragile habitats (heath lands) in areas with large-scale pig production.

## Rural development programs

The rural areas have benefited significantly from the mechanisms leveling regional economic inequalities through a targeted redistribution of government subsidies as described above. In addition, the most remote and vulnerable rural areas have had access to different support schemes over the past decades, including national schemes as well as EU Structural funds and the LEADER programs. The Danish Government and the EU has allocated close to one billion Euros for a rural development program between 2000 and 2006 (Table 8). A large number of programs are administered by the Ministry of Food, Agriculture and Fisheries which aim at creating economic and environmentally sustainable development in the agricultural and forestry sectors (Fødevareministeriet 2000; Fødevareministeriet 2001; EC 2002a). Farmers in rural areas can apply for assistance to several measures which fall under three broad categories:

### 1) Improving living conditions in rural areas

Funds are available for investments in infrastructure, services and environmental assets to make rural areas attractive living places. This includes investment support for farms to adapt to new market conditions, e.g. improving animal welfare. Funds are also available for training schemes to encourage diversification of activities and support measures for young farmers establishing their business.

### 2) Improving the economic situation in rural areas

Investments are available for activities opening up new markets for forestry and developing new products in farming and food processing to meet changed market conditions, e.g. to improve food safety and traceability. Funds are also available for measures encouraging diversification and training, for example through subsidized marketing of tourism and crafts.

### 3) Increased integration of the environment in agriculture and forestry

Funds available under the 2078/92 agri-environmental program will in the future be administered under this program. The main objectives are to reduce nitrate leaching, maintain extensive grazing and establish shelter belts on farm land. In addition, funds for farmers converting to organic agriculture will be available under this program. Funds are available to improve the quality of forests, e.g. encourage planting of deciduous tree species and the use of environment-friendly management systems.

The funds allocated for the specific components of the rural development program between 2000 and 2006 are shown in Table 8.

Within the framework of the rural development program, EUR 61.4 million have been allocated for the Leader+ program between 2000 and 2006. This includes an EU contribution of EUR 17.0 million and a contribution of EUR 27.4 million from the private sector. The target groups of the Leader+ program are women and young people. The program supports activities leading to rural development, such as the development of innovative companies, local service

**Table 8.** Rural development program in Denmark 2000–2006 (million Euros)

Program	Total cost	EU contribution
1. Farm investments	45.6	11.4
2. Setting up young farmers	52.6	26.3
3. Training	46.4	11.6
4. Early retirement	10	5
5. Less Favored Areas	10.8	2.7
6. Agri-environment	304.3	139.8
7. Improving processing/marketing	36.8	18.4
8. Forestry	90	37.1
9. Rural development (Article 33 measures)	101.4	26.2
<b>TOTAL<sup>1</sup></b>	<b>944.5</b>	<b>348.8</b>

<sup>1</sup> Including previously allocated funds for ongoing activities.  
After Directorate-General for Agriculture (2002a).

facilities, protection of the environment and marketing of local products. It is expected that the program will support ten Local Action Groups in Denmark, who will define their own measures and specific goals (EC 2002b; Direktoratet for Fødevarerhverv 2003).

A few counties, containing many remote/vulnerable areas, have benefited from EU Structural funds. These areas have been classified as Objective 2 areas, due to stagnating or declining industries (Erhvervs- og Boligstyrelsen 2002). Most of these areas are located on the seacoast and have formerly based the economy on shipyards, large fishing fleets or agro-industries, such as sugar mills and dairies, which have declined or closed due to economic restructuring. Furthermore, these areas are located far from large urban centers. The Objective 2 areas also include 27 small islands. These areas, which comprise 538,000 persons, will receive 61 Million Euros between 2000 and 2006 to assist the transformation of the industry and upgrade the skills and know-how of the workforce. Two-thirds of the amount stem from the Regional Fund and are earmarked for direct purchase, i.e. investments in new technology. One-third of these funds are administered by the Social Fund, and will primarily be used for education and training of workers in relation to the introduction of new technologies. The overall aim is to assist these areas to move away from the reliance on the primary sector and outcompeted industries into more knowledge-based services and manufacture enterprises.

## Future trends

The future of Danish rural areas is influenced by a range of factors. The market conditions and economic perspectives, expressed by shifts in national and inter-

national demands for different types of goods and services will strongly affect the competitiveness and development potentials in different areas. Furthermore, policy schemes related to market liberalization, e.g. of the agricultural sector, will have a strong impact in rural areas which rely heavily on agricultural production (Arzeni et al. 2002). The Danish Research Institute of Food Economics has developed a number of scenarios which identify different development perspective for rural areas (Hasler et al. 2002). The scenarios are based on the combination of three economic models (macro-level, regional-level and agricultural sector) which forecast the development between 1995 and 2010. The scenarios estimate the effects on income structure in different areas in Denmark (see Table 9). It should be noted that a municipality may belong to several sub-groups (e.g. a vulnerable municipality may also be classified as an agricultural municipality). Related demographic effects (e.g. the tendency of migration from economically ill-favored areas to strong economic areas) have not been analysed in the model.

**Table 9.** Changes in income levels in different areas in Denmark under three scenarios

	Copenhagen and main towns	Smaller towns	Rural areas <sup>1</sup>	Agricultural areas <sup>2</sup>	Remote areas <sup>3</sup>	Vulnerable areas <sup>4</sup>
Base line	+	++	+/-	-	-	--
Liberalization	+	++	+/-	--	--	-
Environmental regulation	+	+	0	-	--	-

<sup>1</sup> All municipalities which are classified as non-urban (the main town had less than 3,000 inhabitants in 1994).

<sup>2</sup> All municipalities where agriculture dominates the economy (share >4 times larger than the national average).

<sup>3</sup> All municipalities with low population density and relatively large distance to urban centers.

<sup>4</sup> Rural municipalities which have experienced a prolonged period of population and employment decline. After Madsen et al. (2003).

### Scenario 1. Baseline scenario

The baseline scenario is based on a projection of current trends into the future. This includes a declining agricultural sector and industrial production due to a falling demand. In contrast, it also includes an increased demand for higher value/developed goods and services. The scenario also foresees a continued increase in productivity and competition within the agricultural and manufacturing sector (full range of conditions and parameters can be seen in Hasler et al. 2002). Given these conditions, an average annual growth of two percent is expected. The concentration of production, which has characterized the agricultural sector in the past decades, is expected to continue, leading to a concentration of production on fewer farms and in fewer areas. Both dairy and crop production is expected to decline, while pig production will increase, leading to

increase in livestock concentration in areas which already have a large livestock numbers. This development is partly caused by an increased liberalization of the agricultural sector, which would reduce prices on dairy products and cereals, thereby favoring pig production. In addition, the baseline scenario also reflects the increase in environmental regulations of the agricultural sector. This scenario would cause substantial regional differences in income and employment levels in Denmark. The dairy farmers would experience decline in income levels, which means that income and employment levels in areas with a high concentration of dairy farms would be negatively affected. As a result, the growth in production value in agricultural municipalities is expected to be six and seven percent less than the national average. The vulnerable areas will experience the growth rate by 9.5% lower than the national average in terms of production value. The regional consequences of the baseline scenario are most pronounced when it comes to differences in production value. However, a similar trend can be detected in terms of income levels, although this parameter is moderated by commuting and transfer between municipalities (e.g., people may live in a rural municipality but work in an urban municipality). The highest growth is expected in the greater Copenhagen area and in major towns, while income levels in rural municipalities are expected to be by 4% lower than the national average. Vulnerable areas are not likely to experience the same type of income moderation due to commuting as rural municipalities located closer to urban areas, and these areas are expected to experience growth rates by 11% lower than the national average.

## Scenario 2. Liberalization of the agricultural sector

The recent reforms of the EU agricultural policy (e.g. the 1992 CAP reform, Agenda 2000 and lately the mid-term evaluation of Agenda 2000), have all affected the subsidy and price levels on agricultural products in the EU countries. Basically, they have attempted to make EU agricultural prices closer to world market prices, meaning a reduction in prices for agricultural products. Scenario 2 is based on a continuation and deepening of this trend. It is based on a complete abolishment of all price support and subsidy measures (e.g. the hectare and headage payment schemes). This would not only affect agricultural production, but also related industries, such as the food processing industry and fertilizer companies. The grain- and dairy sectors, which are currently receiving large subsidies, will be especially strongly affected by this scenario. Furthermore, production of special crops, such as sugar beets and potatoes, as well as related processing industries, will also be negatively affected. The decline in the dairy- and grain sector will partly be compensated by an increase in pig production and a number of service and manufacture branches, where capital and manpower from these sectors will find new opportunities. The impact of this scenario will be highly regionally differentiated, due to the diverse geographical distribution of agriculture in Denmark, as outlined above. Thus, agricultural municipalities with a high concentration of dairy cows, such as in Ringkøbing county in western Denmark, or with a large area sown with

sugar beet production, such as in Vestsjallands county in Eastern Denmark, will be strongly affected. For these reasons, agricultural and remote areas will be strongly affected and may even experience negative growth in production value. Household income levels are also expected to be negatively affected in these areas under Scenario 2. In contrast, the most vulnerable areas will not experience quite as drastic negative development, because the agricultural sector, especially dairy farming, plays a smaller role in these areas, since many large-scale, full-time farms have already disappeared from these municipalities and they have a high proportion of persons receiving social benefits and pensions .

### Scenario 3. Strict environmental regulation of the agricultural sector

Denmark has introduced a range of environmental measures aimed at reducing the negative impact of intensive agricultural production during the past 25 years .The third scenario is based on a continuation of this policy with introduction of even more strict environmental legislation. It is specifically based on the implementation of more strict demands for livestock production, in particular the ratio of land available per livestock unit. In Scenario 3, this parameter is supposed to be more restrictive than today, obliging farmers to decrease the livestock numbers per area, in order to reduce the risk of nitrate leaching to the ground water. As such, it can be seen as a forecast of the effects of a stricter EU Nitrate Directive 91/676 than today. According to this scenario, a stricter land/livestock ratio will lead to a 7.4% drop in livestock numbers compared with the baseline scenario. This will influence the total agricultural production negatively with a 3% decline. This decline will be most pronounced in areas with a high livestock concentration, such as in western Denmark. As a result, production value is expected to be 1.5% less in agricultural municipalities than in the baseline scenario, while income will be 0.3% lower.

The scenarios indicate that policy measures can have a noticeable impact on the future of rural areas and that rural areas need to be divided into several sub-groups, when accounting for future development potentials. Agricultural municipalities will be negatively affected by either a liberalization or introduction of stricter environmental regulation, even more so than vulnerable areas, where the agricultural production plays a minor role in the economy. Demographic movements due to shifts in the economic status of different areas can modify the projected developments.

## Conclusion

Danish rural areas constitute not one but several types of areas, which differ in terms of distance to strong growth centers, population, employment and income patterns. While rural areas on average lag slightly behind the national average for a number of key indicators, concerning population and income levels, a minority of remote municipalities or vulnerable areas have seen a decline in

these indicators over the last decade. Among these areas are the small islands, where isolation and difficult transport and infrastructure situations make it difficult to generate growth as well as areas where the closure of large industrial enterprises and lack of alternative employment opportunities have led to stagnation. However, the large differences between such areas and the rest of the country, which are very pronounced in many countries, have been leveled by the Danish welfare system, including a system of transfer of funds from rich to poor regions, thus compensating for the adverse phenomena in the remote areas to a certain extent.

The future of Danish rural areas is also mixed. Due to the relative importance of the agricultural sector in these areas, they will be negatively affected by policy measures restricting agricultural production or affecting price and subsidy levels. Thus, measures aiming at liberalization of the agricultural market or the introduction of stricter environmental regulations will have a negative impact on most rural areas. However, even the continuation of the present trends of agricultural restructuring, reduced price levels for agricultural and basic industrial products is likely to affect rural areas negatively. The increased number of part-time and hobby farmers in rural areas introduces new opportunities for a more diversified production structure, where new non-agricultural services and goods will be in demand. The rural areas will increasingly be transformed from being solely a production base for agricultural production to multifunctional rural areas.

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