The growth of industries and cities is in many ways dependent on the agricultural sector, and thus indirectly on rural areas. In the past, the agricultural development accelerated the growth of many cities, while, on the other hand, the growth of cities in various regions had a pervasive impact on agricultural production. Nevertheless, populations in general remained rural in character and were mainly involved in agricultural production until the Industrial Revolution. Since then, not only have the cities changed tremendously, but modernization has also changed agricultural production systems and thus the rural community.

In this paper, our aim is to offer new insights into the complex modern interdependency between urban and rural areas resulting from extended urbanization towards the hinterland. We will mainly focus on the developed world and, we attempt to formulate (future) challenges for urban rural interaction resulting from a stylized model of town and hinterland interdependence.
1. Introduction

The regional science literature has traditionally taken for granted the urban-rural divide, leading to a separation between cities and the hinterlands. The hinterland was the area of resource extraction and agriculture (the primary sector) that was necessary for urban modes of living.

The very first towns could only develop because the production of agricultural products exceeded the direct local demand. Consequently, some members of the local society could specialize in certain activities, such as religious, political and health care activities, apart from agricultural production. According to historians, the first cities emerged around 3500-3000 BC in the fertile river valleys of the Nile and the Indus in Mesopotamia and the Hoang-ho in China. Ur was the largest of the cities with a population of about 25,000. More than 1,000 years later, Babylon was the leading city of that time with 50,000 inhabitants. Nevertheless, populations in general remained rural and were mainly involved in agricultural production. Until 1850 (AD), around 4-7 per cent of the people lived in urban areas (Frey and Zimmer, 2001).

It is thought that the first cities served both defensive and religious purposes. When the farmers started to produce more products than they needed, they had to store the surplus of food for some time. Of course, the stored food was an interesting target for thieves so it needed protection. Scale economies in protection led to the development of central storage facilities. The same holds for religious activities. According to Mumford (1961, referred to in O’Sullivan (2000)), large temples at central locations replaced small places of worship in homes and villages. As these temples employed religious workers, areas with higher population densities developed. In those times, it was mainly the richer people who could afford to live in the cities.

In Europe, only 1.6 per cent of the population were living in urban areas in 1600 AD. But with the start of industrialization, urbanization increased rapidly. In England, for example, the urban population doubled twice between 1800 and 1900. Nowadays, urbanization is slowing down in the developed world, partly because of suburbanization. Furthermore, the urbanization process is becoming more dependent on the establishment of new cities than on the growth of older ones (Frey and Zimmer, 2001).

In comparison with the developed world, urbanization in less developed regions started only recently, but there the urban population is growing much more rapidly. It took London from 1800 to 1910 to increase its population from 1.1 million to 7.3 million, but this growth rate has been achieved by some African cities within a generation, while many Asian cities have increased fourfold in the same period. Nowadays, of the 23 mega-cities (those with more than 10 million inhabitants) worldwide, 18 of them are located in the developing world (Daniels, 2004).
An important problem of the less developed areas is that, although the share of urban population is lower, it is more concentrated in fewer (mega-) cities. Low agricultural prices, debt, economic recession, flood or drought disasters are reasons for people to leave their land and migrate to the cities. It is obvious that this kind of urbanization is not sustainable at all, and that the mega-cities are unable to absorb all migrants in a proper way.

In this paper, we describe current urban and rural processes in order to learn more about the interdependency between these two kinds of areas. We will focus especially on developed regions because the current developments in less developed regions are very different and incomparable. Our aim is to better understand the effect of extended urbanization in the rural hinterland, and therefore we describe a model of actors in town and hinterland. Therefore, we first explore the definition of urban and rural (Section 2). Next, we focus more on the development of cities (Section 3), and on the current situation in rural areas (Section 4). We then look at the interdependency of cities and rural areas (Section 5). This leads us to the model of town and hinterland (Section 6), followed by a section describing the future challenges of urban rural interaction (Section 7). Finally we draw conclusions (Section 8).

2. What is urban and what is rural?

The linkages between urban centres and the countryside, including movements of people, goods, capital, and other social transactions, play an important role in processes of rural and urban change. But the ways in which nations define what is urban and what is rural can be very different. The demographic and economic criteria on which definitions of urban and rural areas are based can vary widely between different nations.

According to Frey and Zimmer (2001), there are three elements which best distinguish an urban or rural character of an area. First, there is the ecological element, which includes population and density. In general, all settlements above 2,000 or 2,500 inhabitants are considered urban, but in some countries settlements with only a few hundred inhabitants are sufficient to qualify as urban. In Switzerland, for example, communes of over 10,000 inhabitants (including suburbs) are labelled as urban, while in Norway and Iceland communes with more than 200 inhabitants are called urban (United Nations, 2000).

Secondly, there is the economic element, which refers to the function of an area and the activities that take place. In rural areas, the share of agricultural activities is relatively high, in urban areas the majority of economic activities are organized around non-agricultural production. In urban areas, the diversity of different activities demands a diversely-orientated labour force.
This tends to increase the number of people commuting. Therefore, commuting patterns are often used for defining an urban space. This happens, for example, in northern Nigeria, where the costs of food and accommodation in the cities are very high, leading to high levels of daily commuting from peripheral villages. Another example is the Netherlands, where both urban areas and cities are easy to access by public transport or car. Therefore, the national criteria for urban settlements in the Netherlands are: Urban-municipalities with a population of 2,000 and more inhabitants; Semi-urban-municipalities with a population of less than 2,000 but with not more than 20 per cent of their economically active male population engaged in agriculture, and specific residential municipalities of commuters (United Nations, 2000).

The third element which distinguishes urban from rural areas is the social character of an area. Differences appear, for example, in the way urban and rural people live, their behavioural characteristics, their values and the way they communicate. However, these three elements are difficult to measure, and hence there are many different ways of defining what is urban and what is rural.

3. Cities

Most of the people live in cities because those are the places where most of the jobs are. Besides that, cities are centres of socio-economic interplay, human confrontation, political dialogues, centres of science and art, and a melting pot of cultures and innovations. By living in cities, people achieve a higher living standard, but they must also endure more pollution, crime, noise, and congestion (Verhoef and Nijkamp, 2004; Jacobs, 1969; O’Sullivan, 2000).

The development of cities

Cities can develop because of two conditions; first, agricultural production in the region needs to be high enough to feed both the farmers and the urban residents. Secondly, the advantages must be large enough to either compensate for transportation costs or to undercut household production.

One factor in the development of cities is comparative advantage. This may lead to trade, and when scale economies in transportation occur, market cities are able to develop. Another factor in city development is scale economies in production: large-scale production is more efficient than small-scale production because of factor specialization and indivisible inputs. This results in the replacement of household production by factory production, leading to the development of industrial cities. These cities expand around market places or factories because traders or workers will move towards the market place or factory to economize on commuting.
costs, and bid up the price of land nearby. As the price of land increases, workers economize on land by occupying small lots. This means that the population density around the marketplace or factory will be higher than the density in the rest of the region and a city is born (O’Sullivan, 2000).

In addition, the concentration of residents (labour) and the presence of a factory will attract other firms. By locating close to another firm, firms can produce at lower costs because of agglomerative economies in production. The advantages (or positive externalities) that arise are scale economies in the production of intermediate inputs, labour-market pooling, and knowledge spillovers. These advantages mainly occur when firms are active in the same industry. In addition, some advantages of agglomerative economies in production are generated throughout the whole city (see Verhoef and Nijkamp, 2004). Examples of these advantages are scale economies in the provision of business services (such as banking, real estate and transportation), and public services (such as highways, health care and schools). Stouffer (1940) argued that the level of movement of firms or migrants between two places is dependent on the number of intervening opportunities between them. Intervening opportunities are the character and number of possible alternative migration destinations which may exist between the place of origin and the place of destination. An essential feature of this model is that the character of places, rather than distance, is more important in determining where firms or migrants go.

**Urbanization**

All the advantages described above result in a growing share of people living, and activities taking place, in urban areas: the process of urbanization. At the beginning of the industrialization period, living conditions in cities were very poor, resulting in high mortality rates and lower birth rates than in rural areas. It was only the large rural to urban migration that caused the cities to grow on such a large scale. The immigrating rural inhabitants were attracted by the demand for employment (the industrialization led to a decrease in agricultural employment because of new technologies) and higher wages (Frey and Zimmer, 2001). Around 1940, more than half of the Western European population lived in urban areas.

After the Second World War, extensive suburbanization took place. Urbanites who could afford it preferred healthier and greener (medium-sized) towns, often located near the large cities. This stimulated the growth of commuter villages but also some urban to rural migration affecting more remote rural communities. As a result, the population in big city centres decreased. Suburban growth (people moving to areas just around the city) in the 1970s was even accompanied by falls of 15 per cent or more in the population of the inner areas of cities in many
parts of the developed world (Robinson, 1990). The people who remained in the inner area of the city were often the people with lower incomes.

According to Johnston (1983), there are three different ways to refer to urbanization. The first is as a demographic phenomenon, in which an increasing proportion of the population is concentrated in urban areas. When we focus on urbanization as a demographic phenomenon, we find that official figures indicate that around 75 per cent of the population of the more developed world is considered to be urbanized. In the future, this will be around 80-90 per cent (see Table 1), according to the United Nations. However, at least in the developed world, this upcoming urbanization will no longer consist of growing metropoles, but mainly of the reclassification of existing rural settlements as a result of the outward spread of cities. Several studies suggest a progress of population redistribution down the urban hierarchy, either through a relatively faster growth of smaller urban places or through the absolute decline of the largest cities (Champion, 2001).

Table 1: Urban and rural areas in 2003, projected to 2030

<table>
<thead>
<tr>
<th>Area</th>
<th>Percentage of population living in urban area’s</th>
<th>Average annual rate of change, 2000-2005 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2003</td>
<td>2030</td>
</tr>
<tr>
<td>World</td>
<td>48.3</td>
<td>60.8</td>
</tr>
<tr>
<td>More developed regions</td>
<td>74.5</td>
<td>81.7</td>
</tr>
<tr>
<td>Less developed regions</td>
<td>42.1</td>
<td>57.1</td>
</tr>
<tr>
<td>Least developed regions</td>
<td>26.6</td>
<td>43.3</td>
</tr>
<tr>
<td>Africa</td>
<td>38.7</td>
<td>53.5</td>
</tr>
<tr>
<td>Latin America and Caribbean</td>
<td>76.8</td>
<td>84.6</td>
</tr>
<tr>
<td>Northern America</td>
<td>80.2</td>
<td>86.9</td>
</tr>
<tr>
<td>Oceania</td>
<td>73.1</td>
<td>74.9</td>
</tr>
<tr>
<td>Asia</td>
<td>38.8</td>
<td>54.5</td>
</tr>
<tr>
<td>Europe:</td>
<td>73.0</td>
<td>79.6</td>
</tr>
<tr>
<td>Eastern Europe</td>
<td>68.4</td>
<td>74.3</td>
</tr>
<tr>
<td>Northern Europe</td>
<td>83.3</td>
<td>87.7</td>
</tr>
<tr>
<td>Southern Europe</td>
<td>65.8</td>
<td>74.1</td>
</tr>
<tr>
<td>Western Europe</td>
<td>81.0</td>
<td>86.4</td>
</tr>
</tbody>
</table>

Source: United Nations, Department of Economic and Social Affairs, Population Division, 2003

Table 1 shows that the average share of the world population living in urban areas was 48.3 per cent in 2003. The United Nations predict that in 2030 this will be almost 61 per cent, with most of the growth taking place in the least developed regions (from 26.6 per cent in 2003 to 43.3 per cent in 2030). Unfortunately, in these regions most of the urban growth takes places in mega-cities, reinforcing the existing problems of over-urbanization. Even in Europe, there are different levels of urbanization. In southern Europe, for example, only 65.8 per cent of the population live in urban areas, whereas in northern Europe 83.3 per cent do so. But, according to the calculations of the United Nations, these shares will eventually converge.
A second way to refer to urbanization is as a social and economic phenomenon inherent in capitalist industrialization, as urban areas facilitate linked production, distribution, and exchange processes.

Thirdly, urbanization can be considered as a behavioural phenomenon, in which urban areas act as centres of social change. In this way, urbanization can be seen as a process of infiltration of the countryside by non-farm elements (Bryant et al., 1982). The growth of smaller urban places and the reclassification of existing rural settlements increase the spreading of the urban lifestyle in more rural areas. When urbanites go to live in the countryside, they change the traditional lifestyle there, and this makes the distinction between urban and rural very diffuse (Antrop, 2004).

Another current development in the urbanization process is the growth of urban networks. A good example of an urban network is the Randstad in the Western part of the Netherlands. This network consists of Amsterdam, Rotterdam and The Hague (with Utrecht at the edge) and many smaller cities in-between. These growing cities eventually ‘bumped’ into smaller ‘satellite’ cities creating large urbanised areas in which remaining open (agricultural) areas function more or less as parks for the urbanites. This development often leads to a more tense relationship between urban and rural areas.

**Quality of life**

Among the many positive effects of urbanization and emerging cities, such as economies of scale and accessibility to education and culture, there is also a range of negative externalities, such as congestion, pollution, and criminality. However, the positive impact of agglomeration that comes from reducing transport costs is becoming less important as these costs are falling and large-scale manufacturing is declining. The costs of moving people are, however, becoming increasingly important. Longer commuting times in cities now cause significant costs for both employers and for employees (Glaeser, 1998; see also Harashina and Kumata, 1977). This also holds for pollution costs and costs related to criminality.

Since awareness of the environmental aspects of quality of life has grown, it is increasingly being questioned whether the positive externalities really do outweigh the negative externalities brought about by the city (Camagni et al., 2001). The current interest is in urban sustainability, which comprises a variety of quality-of-life aspects, such as meeting human needs, protecting natural capital at local, regional and national levels, and ensuring that human activities or values are maintained. Societies are concerned not only with economic growth, but also with the built environment and with shaping nature in urban areas in ways they find aesthetically pleasing (see
also van Leeuwen et al., 2002). This increasingly produces a stronger relation between cities and their hinterland.

4. Rural areas

A basic characteristic of economic development seems to be the long-term shift of (economic) activities from agriculture to industry and services. In agrarian societies, with few trading opportunities (often in the less developed regions), most resources are used for the production of food. In more developing regions, the industrial sector can grow, using agricultural inputs. This often leads to a fall of the agricultural share in Gross Domestic Product (GDP), but to its growth in absolute terms. The growth of industries and cities is in many ways dependent on the agricultural sector (Bresciani et al., 2004).

The agricultural sector

Of the total GDP, produced by all agricultural firms in the world, 31 per cent is produced in the United States, 26 per cent in Europe (23 per cent in EU-15), 28 per cent in Asia and Oceania, and only 5% in the Middle East and Africa.

From an economic point of view, the agricultural sector has lost its important position in most developed countries. According to figures of the United Nations, the share of the GDP produced by the agricultural sector in Europe has decreased in almost every country in the last 10 years (see Table 2). However, large country-specific differences exist among the EU Member States (both the EU15 and the EU25). The contribution of the agricultural sector to GDP varies between 7.0 per cent in 2001 in Greece and 0.9 per cent in the United Kingdom. The equivalent range for the other European countries is between 14.8 per cent in Romania and 3.0 per cent in Slovenia. Nevertheless, in the non- EU-15 states, often a larger share of jobs is found in the agricultural sector.

Table 2: GDP by major economic sectors, 1995 and 2001

<table>
<thead>
<tr>
<th>European Union (EU-15)</th>
<th>1995 Agriculture</th>
<th>Industry</th>
<th>Services</th>
<th>2001 Agriculture</th>
<th>Industry</th>
<th>Services</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>2.5</td>
<td>30.8</td>
<td>66.7</td>
<td>2.3</td>
<td>30.5</td>
<td>67.2</td>
</tr>
<tr>
<td>Belgium</td>
<td>1.6</td>
<td>28.1</td>
<td>70.3</td>
<td>1.4</td>
<td>26.8</td>
<td>71.8</td>
</tr>
<tr>
<td>Denmark</td>
<td>3.6</td>
<td>24.9</td>
<td>71.5</td>
<td>2.7</td>
<td>25.3</td>
<td>72.0</td>
</tr>
<tr>
<td>Finland</td>
<td>4.7</td>
<td>32.2</td>
<td>63.1</td>
<td>3.3</td>
<td>32.8</td>
<td>63.9</td>
</tr>
<tr>
<td>France</td>
<td>3.2</td>
<td>26.3</td>
<td>70.5</td>
<td>2.8</td>
<td>24.8</td>
<td>72.4</td>
</tr>
<tr>
<td>Germany</td>
<td>1.3</td>
<td>32.1</td>
<td>66.6</td>
<td>1.2</td>
<td>29.1</td>
<td>69.7</td>
</tr>
<tr>
<td>Greece</td>
<td>9.9</td>
<td>22.4</td>
<td>67.7</td>
<td>7.0</td>
<td>21.4</td>
<td>71.6</td>
</tr>
<tr>
<td>Ireland</td>
<td>7.7</td>
<td>38.2</td>
<td>54.1</td>
<td>3.6</td>
<td>41.4</td>
<td>55.0</td>
</tr>
<tr>
<td>Italy</td>
<td>3.2</td>
<td>30.1</td>
<td>66.7</td>
<td>2.7</td>
<td>27.7</td>
<td>69.5</td>
</tr>
<tr>
<td>Luxembourg</td>
<td>1.0</td>
<td>21.2</td>
<td>77.8</td>
<td>0.6</td>
<td>17.9</td>
<td>81.5</td>
</tr>
<tr>
<td>Netherlands</td>
<td>3.5</td>
<td>27.8</td>
<td>68.6</td>
<td>2.7</td>
<td>26.0</td>
<td>71.4</td>
</tr>
<tr>
<td>------------------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>Portugal</td>
<td>5.2</td>
<td>30.0</td>
<td>64.9</td>
<td>3.6</td>
<td>28.7</td>
<td>67.7</td>
</tr>
<tr>
<td>Spain</td>
<td>4.4</td>
<td>29.6</td>
<td>66.0</td>
<td>3.4</td>
<td>28.7</td>
<td>67.9</td>
</tr>
<tr>
<td>Sweden</td>
<td>2.7</td>
<td>30.1</td>
<td>67.2</td>
<td>1.9</td>
<td>28.1</td>
<td>70.1</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>1.8</td>
<td>30.9</td>
<td>67.3</td>
<td>0.9</td>
<td>26.5</td>
<td>72.6</td>
</tr>
</tbody>
</table>

**Other Europe:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkey</td>
<td>15.7</td>
<td>31.9</td>
<td>52.4</td>
<td>12.6</td>
<td>29.6</td>
<td>57.9</td>
</tr>
<tr>
<td>Albania</td>
<td>54.6</td>
<td>22.0</td>
<td>23.4</td>
<td>51.0</td>
<td>26.3</td>
<td>22.7</td>
</tr>
<tr>
<td>Bulgaria</td>
<td>13.4</td>
<td>32.4</td>
<td>54.3</td>
<td>13.7</td>
<td>28.5</td>
<td>57.9</td>
</tr>
<tr>
<td>Croatia</td>
<td>10.4</td>
<td>33.4</td>
<td>56.3</td>
<td>8.5</td>
<td>29.3</td>
<td>62.2</td>
</tr>
<tr>
<td>Poland</td>
<td>6.9</td>
<td>7.3</td>
<td>33.3</td>
<td>3.8</td>
<td>31.4</td>
<td>64.8</td>
</tr>
<tr>
<td>Romania</td>
<td>20.9</td>
<td>40.3</td>
<td>38.8</td>
<td>14.8</td>
<td>34.0</td>
<td>51.2</td>
</tr>
<tr>
<td>Slovenia</td>
<td>5.5</td>
<td>41.7</td>
<td>52.8</td>
<td>3.0</td>
<td>36.3</td>
<td>60.7</td>
</tr>
</tbody>
</table>

**North America:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Canada</td>
<td>2.9</td>
<td>30.7</td>
<td>66.4</td>
<td>2.6</td>
<td>30.1</td>
<td>67.3</td>
</tr>
<tr>
<td>United States</td>
<td>1.5</td>
<td>27.0</td>
<td>72.3</td>
<td>1.6</td>
<td>24.5</td>
<td>73.9</td>
</tr>
</tbody>
</table>


The decline in GDP or Gross Value Added (GVA), especially in the new Member States can be explained, for example, by growing national incomes. Increase in the national income of a country is closely linked with the rapid development of new branches of activity, particularly market services, which grow in relative terms.

Nevertheless, income from agricultural activity is growing, but at a rate below that of the other sectors. Between 1983 and 1996, agricultural GVA per agricultural job increased at an average annual rate of 4%, as a combined result of a sharp increase in GVA and a reduction in the number of agricultural jobs. Of course, there are wide variations in agricultural GVA per agricultural job within the EU. Denmark and the Netherlands, with their high value-added intensive agricultural activity, record very high levels of GVA per job.

Overall, the level of agricultural employment is decreasing in Europe. But, even though farmers are a minority group in the countryside, they are still the main managers of the land, and agricultural work largely determines the degree of attractiveness of these regions, particularly where the landscape is concerned (Barthelemy and Vidal, 1999).

**Post-productivism**

In peasant society, farming was the main activity, but the farmers also performed many other tasks: farming was multifunctional by nature. But, with modernization, farming has become ‘just’ one occupation among many others. At the individual level, this structural differentiation is visible in the growing specialization of labour: holders of formerly mixed small farms have been advised to opt for one branch (farm specialization) and scale enlargement. Many smaller farms have had to close down, while the size and productivity of the remaining farms has increased.
Higher yields, efficient management, increasing external inputs have all contributed to an increase in productivity (Luttik and van der Ploeg, 2004).

Especially after the Second World War, when many countries in Europe were short of provisions, it seemed very important to modernize the agricultural sector and to produce as many products as possible. But, after some years (in the mid-1980s), the policy of self-sufficiency resulted in excessive surpluses in the form of beef and butter mountains and milk and wine lakes. This had to result in changing agricultural regimes: from a main focus on production of food and fibre, known as ‘productivism’, to a focus on a multitude of functions with an emphasis on food quality and environmental conservation, referred to as ‘post-productivism’. According to Ilbery and Bowler (1998) and Kristensen et al. (2004), the shift from productivism to post-productivism implies that agriculture, on a general level, is moving away from intensification, specialisation and concentration, which are characteristics of the productivist farming period, towards extensification, diversification and dispersal, indicators of the post-productivist farming period. It seems that, after a period of trying to fully control nature by turning ecosystems into quasi-industrial areas with controlled water levels and insecticides to decrease natural processes as much as possible, negative effects (disturbed ecosystems, surpluses of manure, cattle diseases, etc.) were beyond expectations. As a result, the agricultural sector will have to focus more on food quality, environmental processes, and a more sustainable use of ecosystems.

In the developed regions, much of the debate about the agricultural sector focuses on agriculture’s ability to produce joint products. This new farming context in Europe, with a variety of goals and actions, is resulting in a more diversified use of rural areas, partly similar to the use of rural areas before the productivism period, but with a less significant role for the agricultural sector. In developing countries, it is not yet an option to enjoy non-production benefits from the agricultural sector. The most important reason for this is food security and the role of agriculture in alleviating poverty. In the initial stages of development of a region, food represents a major share of the household budget. When agricultural production increases, the real prices of non-tradable food products may decline and the income of smallholders may increase (Bresciani et al., 2004). This means that agriculture is still the most important function in rural areas, and that intensification is often necessary. According to Bresciani et al. (2004), development or transformation of the agricultural sector can slow down the rate of rural out-migration, thus preventing population concentration in metropolitan cities and leading to a more balanced distribution of population over space.

5. Interdependency between urban and rural areas
Permanent settlement is a direct result of the success of agriculture. Cities became efficient solutions to improve trading, which demanded permanent nodes and communication networks (Antrop, 1999). An important function of towns used to be the access to the market. In these markets, farm products could usually be sold without the danger of monopsonistic exploitation, and there were enough sellers to prevent monopoly. Many activities clustered around this market (Rondinelli and Ruddle, 1976). The growth of regional cities had a pervasive impact on agricultural production, and in turn agricultural development accelerated the growth and shaped the economies of many secondary cities. Moreover, even large metropolitan areas provide important markets for agricultural goods, and much of their secondary and tertiary employment is in market-related activities, or in those that depend indirectly on agricultural production (Rondinelli, 1982).

The urban system has always been very important for the allocation of agricultural activities. In early times, people settled in the most fertile areas, since the lack of transport facilities meant they had to live where the food was being produced. Production, processing and consumption were thus located in close proximity. During the Industrial Revolution, a demand for (cheap) labour arose in urban areas, creating competition for labour. As a result, the farms near cities increased their labour productivity, leading to greater specialization and intensification near the cities (Rienks et al., 2005).

Rondinelli (1984) described ten specific ways in which the mutual effects of urban and rural development are manifested. They can be summarized as follows (see Figure 1): First of all, cities provide markets and act as centres of trade for agricultural goods. Urban population growth

![Diagram](image-url)
and agglomeration create increased demand for agricultural products and leisure activities from (nearby) rural areas. Furthermore, cities provide opportunities for off-farm employment.

On the other hand, agricultural development (in early times) provided a stimulus for urbanization and the economic diversification of cities in rural regions. Because cities function as agricultural supply centres and as locations for agri-processing and agri-business activities, employment opportunities are provided for urban workers in a large number of commercial and service activities.

Nevertheless, until recently, rural and urban inhabitants were two completely separate social groups. They had different interests and needs, and they did not often mix. Now, because of the urban-rural migration, often more non-farm residents than farm residents live in rural areas relatively close to a city (up to 100 km). Though these non-farm residents or urbanites live in the countryside (including the small villages), they belong mostly to the cities. At the same time, more country urbanites are becoming part-time or hobby farmers, while more farmers are becoming part-time urbanites by working in the city, leading to a blurred distinction between the two groups (Bryant et al., 1982, p.29). As farmers, hobby farmers and urbanites follow different lifestyles, and this is introducing important cultural changes in rural communities.

Of course, besides the interdependency of cities and agriculture, in addition the amenity value of rural areas was and is of importance. Already in the 16th century, rich citizens built beautiful dwellings in the countryside to enjoy the fresh air and green scenery. Nowadays, with an increasing population, the consumption function of the countryside becomes more and more important for all kind of citizens. Rural areas close to larger cities are considered as the backyard of thousands of urban residents. At the same time, the increasing accessibility of city and hinterland allow rural residents to work and enjoy cultural activities in the city.

Although, the direct interdependency concerning production activities between cities and rural areas appears to becoming less important, the interdependency on a consumption level is growing. Urban and rural areas are getting more interwoven, physically, financially, functionally and culturally. The worldwide transformation from an industrial to a post-industrial society and the ongoing introduction of new information technologies is likely to open up new possibilities for the spatial and economic organization of urban and rural areas (Hidding et al., 2000).

6. Town and hinterland in a model

The famous model of von Thünen (1826) shows the importance of a city for the agricultural sector. In this model, farmers balance transportation costs, the price of land and their profits. But, nowadays, as transport costs are lower and perishable goods can be chilled, the advantages of
farming near a city are less relevant. Instead, urban expansion has increased land prices and caused other disadvantages such as traffic congestion and farmland fragmentation. Nevertheless, positive interactions also remain, such as economic stability derived from participation in non-farm labour or through the adaptation of non-traditional marketing strategies for farm produce (Luttik and van der Ploeg, 2004).

In this second part of the paper, in which we try to describe town and hinterland in a model, we will focus on towns as urban areas. Small and medium-sized towns are often seen as important elements of the (rural) economy, especially because of their strong economic and social linkages with their hinterland. They act as concentration points of farm inputs, consumer goods and services, and they are often a first destination for farm outputs (see, Tacoli, 1998; Courtney and Errington, 2000). To describe town and hinterland in a model, we will first schematize society and the environment. Then we will describe three subsystems, and finally the values, activities and actors in town and hinterland.

*Natural substrate and mankind*

The basic element of our world is the natural substrate (see Figure 2). This consists of natural systems which are independent of human behaviour. We can distinguish between two main subsystems; the biotic subsystem (processes related to organisms and ecosystems) and the a-biotic subsystem (physical and chemical processes). A second very important element is mankind. Although mankind actually is part of the a-biotic subsystem, it can also be seen as the second most important element of our current world. When mankind is living together in a society, a social organization evolves. Within this social organization, three subsystems are commonly distinguished: an economic, a political, and a social subsystem (see Kleefmann, 1984; Hidding, 2002).
When mankind or the social organization interacts with the natural substrate, thus, when man exploits the natural environment, a spatial organization or a man-made environment evolves. In early times, the spatial organization was quite similar to the natural substrate: small settlements were built near existing fertile areas.

**Economic, cultural and political subsystem**

The main goal of society is continuation and survival (Kleefmann, 1984). To be able to survive, society is dependent on the natural substrate, its carrier, and constant interaction is necessary. The social organization and spatial organization are strongly interwoven. The social organization affects the spatial organization according to its goals and activities. But at the same time, these goals and activities are restricted by the spatial organization.

The spatial organization, as part of the natural substrate, allows society to produce goods, which can be consumed or distributed to other regions. This requires, for example, labour, transport activities and trade, elements of the economic subsystem. The way in which goods are produced or to whom they are distributed is related to existing standards in society. The cultural subsystem consists of rules, values and standards of a certain society at a certain moment in time.

A society will survive best when the economic and cultural subsystems are consistent and well integrated. Unfortunately, they tend not to be consistent, which requires intervention and regulation from the political subsystem. This happens, for example, when certain economic developments cause environmental damage. When this is not consistent with the (cultural) values of society, these developments need to be regulated by political rules and legislation. According to Bryant et al., (1982, p. 19), the natural substrate provides the support system for life (air, water and other resources); the economic subsystem contains the activities through which natural resources and human resources are used to provide for the needs of society; and the cultural and political subsystem consists of activities primarily undertaken for motives other than profit or making a living.

In this paper, we are interested in the interaction between urban areas, such as towns, and rural areas. Of course, the spatial organization of these two areas is very different. In urban areas, society strongly affects the spatial organization by adapting the natural substrate in such a way that it becomes a concentration place of activities, and a place to shelter and to live. The rural surroundings (the hinterland) are also affected by society, but the natural substrate is still quite visible. This variation in spatial organization is related to different economic activities and differences in the economic subsystem. In the rural surroundings, agricultural activities take
place as well as certain industrial activities and tourism. The production factors land and space are of importance. In the towns, a whole range of economic activities take place, such as industrial activities, retail and other service activities. There, the production factor labour and the local consumer market play a more important role.

Furthermore, the cultural subsystem includes various aspects that differ between town and hinterland. The socio-economic groups that live in the town (such as village residents, second house owners and urbanites) usually are different from the groups living in the rural surrounding (such as farmers and hobby farmers). But also the perception of the two areas can differ. In towns people appreciate the social interaction, the facilities and accessibility, whereas in rural areas people welcome the peace and quietness. Each area has its own specific values, and, of course, there are also some common values.

Finally the political subsystem handles different rules and policies in town and hinterland because each of these areas has its own problems and opportunities. In the Netherlands, the government is trying to concentrate activities in towns to keep the rural surroundings as ‘empty’ as possible to avoid an untidy or unstructured landscape.

Values, activities and actors in town and hinterland

The new farming context, with a variety of goals and actions, is bringing about a more diversified use of rural areas, partly similar to the use of rural areas before the productivism period, but with a less significant role for the agricultural sector (see Wilson, 2001). The increasing leisure time and mobility of residents is leading to a higher number of visits to rural areas. As well as that, environmental qualities attract residents who want to live in the countryside. The renewed awareness of the value of nature, culture and landscapes is encouraging the conservation of these elements.

Williams (1969, in Bryant et al., 1982) divides the functions of open spaces (rural areas) into six classes;

1) Functions involving activities that are primarily located in the production function (such as agriculture or mineral production),
2) Functions involving especially natural and cultural values (such as sites of particular biological or cultural values),
3) Functions related to health, welfare and well-being, including ‘protection’ functions and ‘play’ functions (such as maintenance of groundwater quality and recreation areas),
4) Functions related to public safety and natural or man-made hazards (such as flood control and aircraft flight paths),
5) Space for corridors and networks (such as infrastructure and nature networks),
6) Space for urban expansion.

In line with Bryant et al., (1982, p.155), it seems that, in rural areas, we are more and more “confronted with a situation of an environment containing various resources, each possessing a range of potential and actual uses or functions, and each associated with different values assigned by individuals, groups and various formal government structures”. It is particularly this range of uses or functions, each appreciated in a different way by several actors, which is creating a complicated situation and problems which are difficult to solve. Our next step is to describe these relations in a schema.

The model

To describe the urban-rural interactions between town and hinterland, we make use of systemic network perspectives. These perspectives refer to complexes of elements or components, which mutually condition and constrain one another, so that the whole complex works together. The analysis of a system comprises key features such as purposes, interaction, integration and their emergence (Rametsteiner and Weiss, 2005).

Figure 3 shows the different uses/activities which take place (as part of the economic subsystem), the values/resources which are present (derived from the cultural subsystem), and actors or users of the town and hinterland. In the following tables (Table 3 and 4), we also describe problems or conflicts (in need of, or already involved with, regulations and rules from the political subsystem). In Figure 3, we make a distinction between the towns, the squares in the figure, and its (direct) hinterland, the surrounding circles. In the hinterland several values are present: there are resources located in various places; open space is available; often plants and animals can be found; cultural heritage in the form of old farms, mills etc. is present; and one can enjoy a certain amount of peace and quietness. These values allow certain activities to take place. The activities we distinguish are closely related to the six functions of open space described by Williams in 1969. First, we distinguish production activities, such as agriculture, industry, transport, the conservation of nature and cultural heritage and flood protection. In addition, consumption activities take place, such as tourism and residential activities. Finally, infrastructural networks and other towns are located in the hinterland.

Certain values are also located in the towns. First, available resources can be the reason for the establishment of the town. Furthermore, a market of consumers and employees is

---

1 Again, we can make a distinction between the economic subsystem with its uses or functions of rural areas, the cultural subsystem, including the assigned values to these functions, and the political subsystem which tries to integrate the former two subsystems.
available, as well as various facilities, cultural heritage, and social interaction. These values are a result of, or they result in, a range of activities. Activities related to production are industrial and (public) service-related activities. On the consumer side, the town is used for residential activities and recreational or tourism activities.

According to Bryant et al., (1982), values and activities in rural areas are appreciated in different ways by different groups in society. Therefore, in our schema, we first distinguish the actors in the town (see Table 3) and hinterland (see Table 4). We have divided the actors by their (main) role in the production or consumption landscape. In the next column their activities are described, followed by columns listing the related values and possible problems.

**Table 3: Actors, activities, values and problems in the production and consumption landscape of the town**

<table>
<thead>
<tr>
<th>Town</th>
<th>Actors</th>
<th>Activities</th>
<th>Value</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prod</td>
<td>Firms</td>
<td>Industry, services, transport</td>
<td>Primary Resources, agglomeration of activities,</td>
<td>Pollution, policy restrictions, lack of consumers, congestion</td>
</tr>
</tbody>
</table>

**Figure 3: Actors, activities and values in the town and hinterland**

Figure 3 illustrates the relationship between the town and its hinterland, showing how actors, activities, and values interact within this landscape.
<table>
<thead>
<tr>
<th>Consumption landscape</th>
<th>Households</th>
<th>Shopping, residential activities, recreation</th>
<th>Facilities, social interaction, ethical values</th>
<th>Pressure on cultural values, lack of facilities, no local involvement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Visitors/Tourists</td>
<td>Shopping, recreation</td>
<td>Facilities, cultural heritage</td>
<td>Pressure on cultural values, lack of facilities</td>
</tr>
</tbody>
</table>

**Town actors**

Small and medium-sized towns (SMTs) in rural areas are often attractive tourist places. The old market, church, and city hall tell us something about the importance and role of towns many years ago. Then, they where places where products where sold and bought, deals were made; they were trading places. Residents from smaller towns or from the countryside regularly visited these market towns for business and pleasure. Although the role of SMTs is not that important anymore, the same kind of actors are still present.

The first group of important actors in the production landscape are firms: industrial firms, but also service firms. Industrial firms can be attracted to a town because of the presence of primary resources or because of other spatial advantages such as the proximity of a river. More often, they are located in a town because of the advantages associated with the agglomeration of firms, and this also holds for service firms. Firms are also attracted to towns because of the consumer market. Retail shops, hairdressers, and other service firms sell their products and services to the households which demand them.

The second group of important actors in the production landscape of the town are the households. They are part of the labour market and according to earlier research, in particular small local firms employ local labour(from the town and its direct hinterland) (van Leeuwen and Nijkamp, 2005).

The third important actor is the government. It provides public services, and maintains the (green) environment and infrastructure, often using local employees.

The final group of important actors in the production landscape are the cultural heritage organizations which produce city landscapes from the available cultural heritage which can be consumed by households and visitors.
Table 3 also describes two groups of actors in the consumption landscape of the town. The first of these actors are the households, who use the town for their shopping, residential, and leisure activities. Households from the town itself and the direct hinterland make use of the facilities that are concentrated in the town. Important facilities are shops, but also schools and health care. Furthermore, social interaction attracts households to a town.

The second group of actors in the consumption landscape are the visitors or tourists. They visit the town to ‘consume’ the relative quietness and peacefulness, together with the historic charm: the cultural heritage. Of course, the availability of facilities, such as shops and cafés, is also important for tourists.

Table 4: Actors, activities, values and problems in the production and consumption landscape of the hinterland

<table>
<thead>
<tr>
<th>Hinterland</th>
<th>Actors</th>
<th>Activities</th>
<th>Value</th>
<th>Problems</th>
</tr>
</thead>
<tbody>
<tr>
<td>Production Landscape</td>
<td>Farms</td>
<td>Agriculture, recreation, transport</td>
<td>Primary resources, space/openness</td>
<td>Pollution, policy restrictions, congestion, urban pressure</td>
</tr>
<tr>
<td></td>
<td>Firms</td>
<td>Industry, services, transport</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Government</td>
<td>Flood protection, conservation of nature and cultural heritage</td>
<td>Space, biodiversity, cultural heritage</td>
<td>(Policy) restriction to other activities</td>
</tr>
<tr>
<td></td>
<td>Nature and cultural-heritage organizations</td>
<td>Conservation of nature and cultural heritage</td>
<td>Biodiversity, cultural heritage</td>
<td></td>
</tr>
<tr>
<td>Consumption Landscape</td>
<td>Households</td>
<td>(Second) houses, recreation, travelling</td>
<td>Biodiversity, cultural heritage</td>
<td>Pressure on biodiversity, cultural heritage, peace and quietness</td>
</tr>
<tr>
<td></td>
<td>Visitors/Tourist,</td>
<td>Recreation, travelling</td>
<td>Peace/quietness/space</td>
<td></td>
</tr>
</tbody>
</table>

**Hinterland actors**

Table 4 shows the actors located in the hinterland. These actors are often attracted to the hinterland because of special soil qualities, the availability of space, or the availability of infrastructure. An important group of actors are the farms. A unique feature of the agricultural sector is its physical link to the soil conditions, and therefore its strong relationship with its surroundings. Although in most rural areas the primary sector has become less important in terms of its economic weight and share in employment, farmers are still the main land users and they play a key role in the management of the natural resources in rural areas and in determining the rural landscape and cultural heritage (van Leeuwen and Nijkamp, 2005).
Firms are the second important group of actors. They are attracted to the hinterland by the availability of primary resources and space or by the presence of other firms or farms (agribusiness). Furthermore, the government and nature and cultural heritage organizations can also be seen as actors in the production landscape of the hinterland. Besides the ‘production’ of infrastructure by the government, they are all active in the production and conservation of rural landscapes.

The actors of the consumption landscape are again households as well as visitors or tourists. In the hinterland, they enjoy the landscape, biodiversity, quietness and rest. Besides that, they also use the hinterland to travel to other towns or areas.

Possible problems and difficulties
Most problems or difficulties arising in towns and their hinterland are related to sustainability and quality of life problems. Of course, this also holds for the larger cities but, nevertheless, the problems are slightly different. Just as in larger cities, the problems related to sustainability in towns are mostly related to pollution from traffic and industrial activities. In addition, congestion, from urbanites living in towns and working in cities, is becoming a more important issue. In the hinterland the agricultural sector in particular has to deal with sustainability issues. Much legislation, and many of the subsidies and restrictions aim to improve environmental quality, but at the same time strongly affect farm activities.

Other problems are more related to quality of life issues. In many smaller towns, the availability of facilities is decreasing. For most town residents this is often not a major problem, but for certain households groups such as the elderly or the disabled this is a very important issue.

7. Future challenges in urban rural interactions
An important characteristic of rural areas is the dominant position of the agricultural sector. Not only is the production process of farms different from that of firms, but also the lifestyle of those persons active in the agricultural sector often differs from the rural lifestyle of those who are engaged in other non-farm activities. With the decreasing economic importance of agriculture, new economic activities are possible and needed in rural areas in order to achieve more consistency between urban and rural areas.

The challenges for farms and firms in town and hinterland are quite similar. First of all, policy restrictions and legislation related to environmental problems require farms and firms to produce in an efficient and sustainable way. For farms near towns or cities, this often means that
they have to start engaging in new (additional) activities. Other farms will decide to produce their products in a very efficient and modern way, focusing only on (an almost industrial kind of) production. However, agricultural firms still play a very important role in maintaining cultural (agricultural) and sometimes natural landscapes.

For service-related firms (especially in the towns), a lack of consumers can affect their business. Town residents who used to live in the city, and who still have employment there, often do their shopping in the city as well. Furthermore, large shopping malls, located in the urban fringe tend to attract former clients of the shops in the town centre.

When looking at the consumption landscape of town and hinterland, other challenges arise. An increasing number of households in town and hinterland can put pressure on cultural values in the town and on natural values in the hinterland. This also holds for the growing number of visitors and tourists. Therefore, it is important to integrate new houses and new leisure activities in town and hinterland in a sustainable way. On the other hand, in some towns, the challenge is to have enough facilities for households and tourists. When people tend to buy more products in the city or in large shopping malls, smaller shops and service facilities can disappear from the town centre. This leads to an almost obligatory dependency of the town on the nearest big city, whereby the town only has a residential function. Either way, it seems that in the future, city, town, and hinterland will become more dependent on each other and more similar concerning economic and cultural characteristics.

8. Conclusions

When we look at developments in urban and rural areas in European countries, it appears that, until recently, in both these areas they were oriented towards intensification. The share of urban population was increasing, as was the level of production in (agricultural) rural areas.

Nowadays, this situation seems to be changing. In urban areas, urbanization no longer consists of continuously growing metropoles, but mainly of the reclassification of existing rural settlements as a result of the outward spread of cities. Champion (2001) observes in several studies a process of population redistribution down the urban hierarchy, either through a relatively faster growth of smaller urban places or through the absolute decline of the largest cities. In rural areas, the shift from productivism to post-productivism implies that agriculture, on a general level, is moving away from intensification, specialization and concentration, which are characteristics of the productivist farming period, towards extensification, diversification and dispersal, indicators of the post-productivist farming period. These similar developments indicate
that the urban and rural subsystems are no longer separate systems, but are closely linked by the common values and standards of the entire society.

Of course, the interdependency between urban and rural areas used to be much clearer. At first, cities provided markets and acted as centres of trade for agricultural goods. Urban population growth and agglomeration created increased demand for agricultural products and leisure activities from (nearby) rural areas. On the other hand, agricultural development (in early times) provided a stimulus for urbanization and the economic diversification of cities in rural regions. Because cities function as agricultural supply centres and as locations for agri-processing and agri-business activities, employment opportunities were (and still are) provided for urban workers (Rondinelli, 1983). But in our time, with the increasing export and import of agricultural products, the relations are less obvious. The cities are no longer dependent on their own hinterland but on agricultural areas somewhere else in the country, in Europe, or even somewhere else in the world. This results, at least in Europe, in cities claiming their immediate hinterland as their own backyard. Urbanites buy houses in smaller towns, but often keep their job in the city. Extra leisure time allows citizens to spend more time in ‘their backyard’ on foot or on bike. Of course it is important that this backyard is easily accessible and well kept, with green meadows, some trees, and cute animals. In this way, the urbanites impose their preferences and conditions on the rural population and firms. Nevertheless, the rural population also benefits from these developments, and they themselves often reinforce the connections with the city. They invite urbanites to buy their products and services, such as home-made products and camping opportunities. Furthermore, they use the city for part-time jobs, specialized education or cultural entertainment.

From all this, we can conclude that, although the direct interdependency concerning production activities between cities and rural areas appears to becoming less important, the interdependency on a consumption level is growing. This is leading to greater integration and the increased merging of urban and rural populations, traditions and values.

**Literature**


