Plurality and Rurality
The role of the countryside in urbanised regions

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(eds.)

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From November 11 till November 14, 1998, an EAAE seminar (the 60th) was held in Berg en Dal in the Netherlands. The theme of the seminar was the role of the countryside in urbanised regions. This book contains most of the papers presented there. The main conclusion is that the problem of rural regions under urban pressure is not restricted to a few highly urbanised countries, but is at stake in all the countries of which representatives attended the seminar (Belgium, Britain, France, Italy and the Netherlands). In all these countries regions can be identified in which the building of new houses and infrastructure damages the identity of rural areas near the city, and thus destroys many possibilities for recreation. It is a slow process that cannot be stopped by a top-down policy. New, more bottom-up approaches are required. This implies a revised research agenda.

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Preface

In March 1997 some of us attended the 48th seminar of the European Association of Agricultural Economists (EAAE) about rural development in Dijon (France). It was an impressive happening, partly due to the fact there were so many participants. Nevertheless, it was also a bit disappointing. The problem of rural development was restricted to the problem of less favoured areas, at least in the sessions we attended. Another point was that most speakers were economists. And of course there is nothing wrong with economists. But it is a pity when an interdisciplinary problem like rural development is looked at only from the viewpoint of one discipline. It was rather amazing to see and hear for instance that some of the speakers seemed to be unaware of the insights gained in human and economic geography.

So, the idea was borne to organise an interdisciplinary seminar on rural development ourselves. The theme should be: rural regions under urban pressure. In 1998, from November 11 till November 14 this seminar was held in Berg and Dal in the Netherlands. It was organised as the 60th seminar of the EAAE. Its official title was: Plurality and Rurality: The role of the countryside in urbanised regions. It was attended by about 25 persons from 5 different countries and with different disciplines (see appendix 1).

This book is a report of the seminar. It is organised as follows. Part 1 is devoted to the main lines. Questions are:

- what was the goal of the seminar;
- what method was used to achieve that goal;
- what were the results?

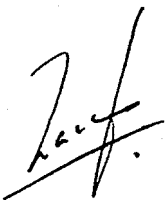
The papers are at stake in the parts 2 to 5. They are presented in four clusters: general; methodological; cases; keynotes. Every cluster has a short introduction that gives a comprehensive overview of the papers.

The seminar was organised by the research group Economic Aspects of Rural Development of the Netherlands Agricultural Economics Research Institute (LEI) and the department Rural Land Use Planning of the Winand Staring Centre for Integrated Land, Soil and Water Research (SC).

Of course, seminars can no longer be organised without financial support. We were supported by the (Dutch) Ministry of Agriculture, Nature Management and Fisheries, the Ministry of Housing, Spatial Planning and the Environment, and the National Council for Agricultural Research. We are very grateful for this support.

Furthermore, we would like to thank all the participants for their stimulating contributions. Although the papers have been formatted in accordance with the LEI's house style, the responsibility for the contents remains with the authors.

The managing director,



Prof. Dr. L.C. Zachariasse

Introduction

1. Introduction

Hans Hillebrand

1.1 Problem

Since World War II the role of the countryside in urbanised areas has changed dramatically. Not so long ago, many people considered the countryside as the space for agricultural activities. Due to (sub)urbanisation, the growing need for recreation facilities, changes in agriculture and environmental issues, part of the countryside has become the playground for many other kinds of human activities. North-western of Europe can be seen as one urban field.

The consequence of this development is a countryside gradually loosing its traditional identity, its uniqueness, which can be summarised with the words 'Space', 'Silence' and 'Beauty'. In most urbanised areas it is precisely these characteristics that are highly valued by the people. The question then rises which new roles and identities for the countryside in urbanised areas can be identified, and how they can be realised in such a way that the uniqueness is preserved.

From the policymaker's perspective a strategic issue is to what extent a 'tragedy of the commons' will result from the urbanisation processes, and what strategies are necessary to find new identities for the rural regions and to reduce the potential loss of the uniqueness of the countryside.

Such demanding questions confront researchers more and more with the notion that multidisciplinary, more process-, design- and development-oriented approaches are necessary. The important task is how to integrate the various perspectives in a consistent way. So, from the researcher's perspective there is a need for a conceptual framework considering the way people maximise their welfare given scarce means of production. 'Welfare' has to be defined in economic, ecological, spatial and liveability terms. The framework should combine analytical and design approaches.

1.2 Questions

The main questions are:

- which actors should be distinguished in the rural playground in different countries, and to what extent can economic, geographical and other theories explain their intentions, behaviour and interactions;
- which relevant actors can we expect for the near future and how will this influence the countryside;
- to what extent can new Urban-Rural and other strategies or concepts be developed, in which actors' goals are matched and new qualities for regions with many rural-urban interrelations are generated;

- what (new) roles for state and public actors can be distinguished? To what extent is state interference necessary as a result of unpriced but highly valued elements of the countryside;
- how can agent behaviour be modelled as a means to understanding the complexity?

1.3 Goal and method seminar

The goal of the seminar was stated as follows:
- an analysis of the problem of rural regions under urban pressure, including aspects of this problem;
- the establishment of a research agenda for this problem.

Especially the last point was brought forward as a very important point. In order to achieve this goal a method was chosen that can be summarised with the following words: divergence and convergence.

Divergence

A small group of researchers from different disciplines and different countries was invited to satisfy our demand for different views on the same matter: rural regions under urban pressure. The group included economists, geographers, demographers and spatial planners. The participants were from Belgium, Britain, France, Italy and the Netherlands. Each of the participants wrote a paper about (a part of) the problem sketched above. In total we received 18 papers about very different subjects. We clustered these papers in three groups. One group had as a main topic the problem of rural regions under urban pressure in general. In the second group more methodological papers were put together. The last group can be summarised with the word 'case studies'. Although this demarcation is not very strict, it gives a general impression of the contents of the papers.

Convergence

It is not possible to tackle a problem when only knowing the elements of which it consists. What is required, is a shared insight into the relations between these elements. This could be called the structuring of the problem. We used two methods to achieve this. First we invited two keynote speakers to tell us their vision. The first keynote speaker was Hans Hetsen from the Dutch National Council for Agricultural Research (NRLO). The NRLO published a few weeks before the start of the seminar the report 'Rural areas put on the map. Knowledge and innovation priorities. Aspirations for the 21st century' (The Hague 1998). This report intends to be the agenda for research in the Netherlands regarding the rural area. Hans Hetsen informed us about this report. As his opponent was invited Andrew Errington from Plymouth' University, Department of Land Use and Rural Management.

The second tool we used to structure the problem was the organisation of a Group Decision Room (GDR). A GDR is a computer assisted discussion. The input we used for this GDR was the knowledge gathered during the seminar about the problems to be solved

and the research to be done, and of course the knowledge, experience and ambitions of the participants. The aim of this GDR was to come up with a research agenda on which at least some of the participants would like to co-operate.

1.4 Results papers

It is impossible to summarise all the presented papers in a few words. We have to restrict ourselves to a few, necessarily subjective, observations. The first is that the problem of rural regions under urban pressure is at stake in all the countries for which papers were presented. A second observation is that the urban pressure is both physical and mental. By the first is meant that more space is needed to built houses, roads and so on. By the second that people tend more to appreciate the 'quality' values of the rural area like open space, silence, landscape and so on. A third observation is that there is a growing discussion about the provision of public goods in rural regions. The general idea is that the providers (f.i. farmers) are not always the persons that get the rewarding, and that the government should leave more over to private parties. A last observation is the internationalisation. This makes one to look different at problems (see for instance the paper of Smeets below), but also diminishes the potentials of countries to follow a policy of their own.

1.5 Results GDR

A top nine for research questions was designed and agreed upon:
1. Stakeholders choice behaviour, including bounded rationality, motivations and perceptions;
2. Rural policies and the creation of new meanings of the countryside;
3. The demand of urban people versus the demand of rural people;
4. Property rights and the managing of plural areas;
5. Marginalisation and landscape management;
6. Transaction and transformation costs of alternative types op land use and economic activity on peri-urban farms;
7. Processes for 'bottom-up' initiatives;
8. The re-evaluation of de-centralising economic activity from major urban centres;
9. The development of a typology of town and countryside.

For four research questions preliminary projects proposals (potentially to submitted for the EU 5th Framework Program) were formulated: Meanings of rurality; Property rights; Marginalisation; Urban centres.

1.6 GDR questions versus NRLO themes

The research questions that came out of the GDR are on an operational level. This makes them in some way appealing, but some people would appreciate a more general

formulation. Such a formulation may be found in the research topics suggested by the Dutch National Council for Agricultural Research (NRLO - see the paper of Hetsen in this book). The NRLO in the document 'Rural areas put on the map' (The Hague 1998) puts forward four research topics:

- Internationalisation and rural areas;
- Quality level and liveability of multifunctional rural areas;
- Interaction between town and countryside;
- Process control in rural areas.

How do the GDR research questions fit in the broad framework of the NRLO? Internationalisation is at stake in all the questions. For the other themes figure 1.1 summarises the relations [1]. We can see that the research questions of the GDR well fit in the NRLO scheme. This means that they can be seen as operationalisations of the themes mentioned by the NRLO.

	NRLO research themes		
GDR questions	Quality level	Town and country	Process control
Choice behaviour	X		
New meanings			X
Urban and rural demand		X	
Property rights			X
Marginalization	X		
Transaction costs		X	
Bottom-up initiatives			X
Urban centres		X	
Typology town and country		X	

Figure 1.1 GDR research questions and NRLO research themes Quality level, Town and countryside, and Process control

1.7 Conclusion

The main conclusion of this seminar is that the problem of rural regions under urban pressure is at stake in all the countries investigated during the seminar (Belgium, Britain, France, Italy, the Netherlands). In all these countries regions can be identified in which the population growth in the cities is a threat for the rural areas involved and indirectly for the cities themselves. The building of new houses and infrastructure damages the identity of the rural area, and thus destroys many possibilities for recreation near the city. This is in most cases a slow process, but it is irreversible. The last mentioned factor makes it important to tackle the problem in a stade in which it is emerging.

Lessons from the Netherlands learn us that a top-down policy for conservation of the rural area does not fully work. The internal dynamic of regions is very often too high, of course related to the aspirations of people living in such regions. New policies should be more bottom-up. Important questions are:

[1] Per GDR question we tried to identify the most important NRLO theme.

- How can such policies be organised;
- Who are the actors involved and what do they want;
- What economic activities can be stimulated in the rural area that enhance the rural qualities;
- What role can agriculture and horticulture play in this process;
- What roles have other economic sectors?

This book tries to answer some of these questions. But there remains a lot of research to be done. We hope the papers will inspire the reader to take part in the discussion.

General papers

2. General papers: overview

Hans Hillebrand

The five general papers selected for this book can be divided in two groups. In the first group we find two papers that use a macro perspective, whereas the papers in the other group are more on a micro level. We start with the two macro papers.

Smeets underpins the importance of the right geographical level when formulating problems. The south-western part of the Netherlands, for instance, can from a national point of view, be seen as a remote area. But when this area is placed in an international perspective, it is in-between economic booming areas like Rotterdam and Lille. Eventually, the whole north-western part of Europe is one big metropolitan area. This makes transnational planning important, not to say obligatory.

Goetgeluk, Schotten and Groen present a tool to evaluate spatial policies ex ante. In their paper they use this tool to investigate whether the four different Spatial Perspectives for the future of the Netherlands (2030), designed by the Dutch National Planning Agency (RPD), are feasible. They also look at the options for new policy instruments that may stimulate the positive and restrict the negative effects. Special attention is paid to the role of the farmers, that own most of the land. With their research they enable a serious discussion about the usefulness and desirability of the perspectives.

After these rather macro papers, the others go, as was already said, more in-depth. Overbeek reports about the results of an EU research that analysed the labour situation of farm women in several rural regions in Norway, Italy, Greece and the Netherlands. She concludes that trends in agriculture that provide women employment opportunities are not so much related to the diversification of farm activities, but more to the increase of labour intensive production. Furthermore, the realisation of a job outside depends on the presence of jobs, but also on the relevant human capital and the labour orientation of the women involved.

Evans investigates the conflicting geographic imaginary in the countryside. These imaginary cast the rural as place of desire as well as of repulsion. He illustrates this by closely observing one particular fissure in rural-urban relations as expressed by the Countryside Rally (July 10, 1997) and the Countryside March (March 1, 1998) in which many 'rural' people marched into London to protest what they saw as an urban attack on 'country' ways of life.

In the last paper, Slee stresses the fact that rural areas in the UK have had diverse functions. Attempts to explain processes and patterns of change, he states, can be grouped into people-based approaches and land use-based ones. He investigates changes in a Scottish 'urbanised' rural area. He concludes that any satisfactory explanation of the patterns and processes of change in the urbanised countryside must recognise the interaction between economic and regulatory forces.

3. Neurocity or Deltametropolis?

Peter J.A.M. Smeets

3.1 Neurocity: here it comes

The Delta in the Dutch context radiates an almost magic spell. It links directly to our roots. The large infrastructural works in the estuaries of the south-western part of Holland, which were built following the floods of 1953, were named Deltaworks rather than Estuaryworks. The word Delta ever since represents something 'huge' and 'gripping', a phenomenon for which we are only too eager to put aside our tradition of democratic and slow decision-making according to the Poldermodel. The harbours of Rotterdam and Antwerp are situated in the 'Golden Delta' (Gouden Delta) or 'Large Delta' (Grote Delta; Hennekam, 1997) and are also elaborated on as the 'Rhine-Schelde Delta' (D'hondt, 1997).

After the threatening floods of the Rhine and Meuse in 1995, a 'Delta-law on Large Rivers' (Deltawet Grote Rivieren) was made, and today a number of initiatives are being taken that no longer use the Delta-metaphor as a response to disasters or evil, but rather as the legitimacy for development perspectives. Legislators and aldermen in large cities use the 'Deltametropolis' (Deltametropool, 1998) as a slogan on pamphlets that propagate their laudable initiative to improve public transport in the Holland Randstad area. The Ministry of Agriculture, Nature Management and Fisheries, has recently brought into being a highly illustrative pamphlet 'The Green Delta'.

3.2 New York in Europe?

A survey on cities by The Economist (1995) concluded with an intriguing question:

> 'Taking an even longer view, the growth of cities in increasingly integrated markets raises another intriguing possibility. In the United States, cities follow the so-called 'rank-size' rule. The largest city, New York, is twice the size of the two next biggest (Los Angeles and Chicago), which in turn are twice as large as those at the next level (…). And it can be remarkably precise. America's tenth largest city is Houston with 3.5 m people. The 100th largest is Shreveport, with 380,000. Now suppose the European economy becomes as integrated as that of the United States; might that cause a European New York to emerge, twice as large as any other European city?'

The Economist does not apply the rank size rule correctly. According to this rule, the largest city is twice as large as the second largest, which in turn is twice as large as the third largest etcetera (see for example Berry, 1967). Nevertheless, the idea is intriguing because the rank size rule until recently could not be applied to European nations. This was explained by strong centralistic politics, that lead to the development of European megacities such as Paris and London (Van den Berg).

Buijs (1998) points on the difference between the medium-sized cities within the so-called 'blue banana', the strongly urbanised diagonal zone that broadens from Middle England into north-western Europe and runs south along the river Rhine towards Northern Italy on the one hand and the traditional European metropolises like Paris, Berlin, Vienna and Copenhagen on the other, outside the 'blue banana'.

A much loosely organised federation of European states would, according to the Economist, lead to the development of a European Supermetropolis, a European New York. When we study the map of Europe and focus on population density (figure 3.1), the available sites for the development of a New York-like metropolis are limited to this 'blue banana'.

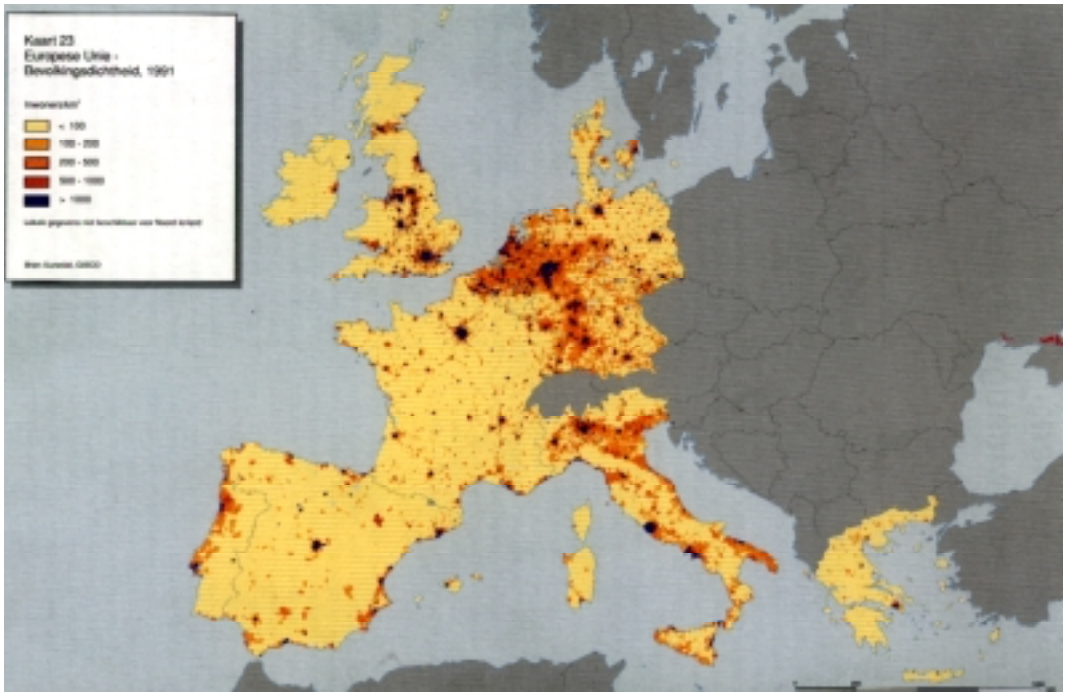


Figure 3.1 Population density in the former European Union of 12 member states. (European Commission, 1995)

Within this area, two regions can be considered: the so-called Centre Capital Area (north-western Europe in between the cities of London, Paris, Köln and Amsterdam), and the Arc Alpine area. Centre Capital forms the most important European spatial concentration of people and economic means, whereas Arc Alpine is the runner up, but spatially too dispersed to grow into a real metropolis.

Centre Capital therefore seems to be the most likely area for the development of such a megacity. A more detailed look at population density reveals that this Centre Capital falls apart into three subregions: south-eastern England with London at its centre, the Paris basin, and a huge area in which the population density exceeds 100 inhabitants/km^2: the triangle Lille, Amsterdam and Ruhr area, eastwards extending towards Frankfurt and Bielefeld: the north-western European Delta Metropolis (figure 3.2).

This 'Northwestern European' urban area I call Neurocity, a metaphor: non-intervention in the current urban development processes within this area will, in the long run, lead to ongoing suburbanisation and decline of city centres. Already numerous examples of these developments exist within the area.

The pamphlet 'Deltametropolis' (Deltametropool,1998) contains information on these threatening developments. The scope of view of the pamphlet, however, should be extended towards north-western Europe, rather than the (inter) provincial scale of the western parts of the Netherlands (Holland Randstad).

The following quotations from the pamphlet come straight from the heart:

> 'Spatial dynamics can not be contained within territorial boundaries of municipalities, provinces or states' and: 'Because of vanishing borders between European nations, the European role that the Netherlands is to play in the future will be largely determined by our ability to develop an urban complex of international stature, a European metropolis.'

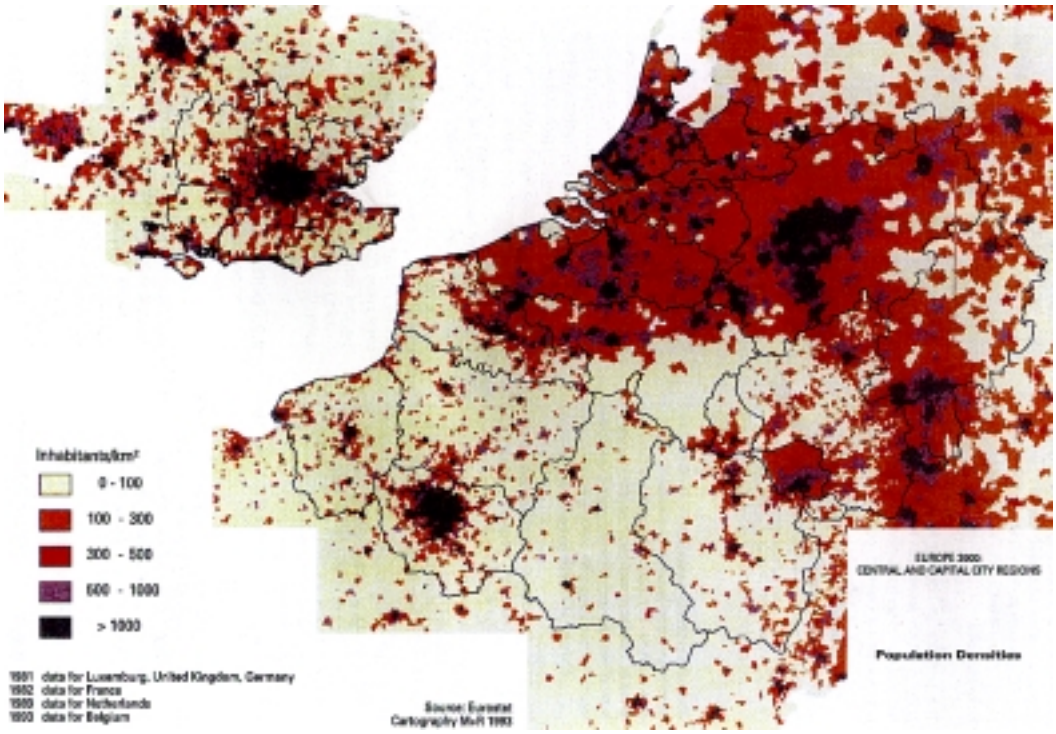


Figure 3.2 Population density in Northwestern Europe (European Commission, 1996)

3.3 Corridors as carriers for metropolitan development

The term Deltametropolis has been superseded in yet another way. Only in its historical development is Neurocity bound to the delta of the rivers Rhine, Meuse and Schelde.

Furthermore, the term Delta is in fact inappropriately used, because the delta of the river Rhine only begins at the junction of the upper Rhine into Lower Rhine and the river Waal at the German Netherlands border. And although Neurocity may have its roots in the delta, since the mid 19th century the ongoing urbanisation is based at least partially on rail and road infrastructure in addition to waterways.

These bundles of infrastructure are the backbone of corridors in which the Northwestern European development process is supposed to take place (Verkennis and Groenewegen, 1997). And even though, according to these two authors, the corridor concept should not be used in retrospective, the metaphor nevertheless offers a perfect description of the development of the medium-sized Dutch cities, in the first six decades of this century into the Randstad and between 1970 and now further on into the Dutch city ring (see also Jacobs, 1997). Corridors in the Centre Capital Area are indicated on the map 'Development Possibilities' in the report Europe 2000+ from the European Commission (1995) (figure 3.3).

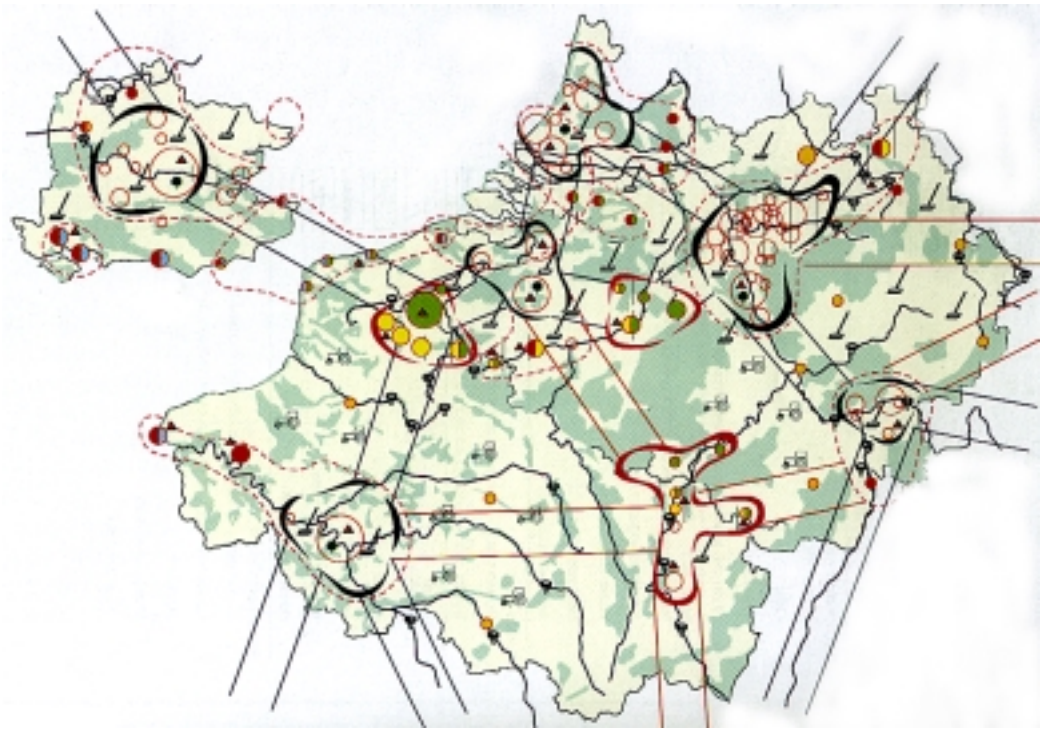


Figure 3.3 Development Possibilities in North Western Europe (European Commission, 1995)

Neurocity or the Delta Metropolis is the next stage in this development. It is the poly-nucleair metropolis, of which the development can be explained for instance the German concept of Groß- or Agglomerationsräume, which is defined as: 'the circumjacent from where the centre of town can be reached within one hour of travelling time. 'When we apply this definition to the map of the Centre Capital Area and draw imaginary circles with a radius of 50 km around the cities with over 500,000 inhabitants, it immediately becomes

clear that in the area between Lille, Amsterdam and Köln these circles overlap to such an extent that no greater critical mass can be found anywhere else in Europe (figure 3.4).

Figure 3.4 Agglomerationsräume in Northwestern Europe

This critical mass is translated into large investments aimed at improving and extending infrastructure in the area. The reason behind all the separate investments is the threat of congestion in the area, but the effect will be, in line with the corridor principle, an increasingly riveting of numerous existing borderland agglomerates.

Many inhabitants of what forms the different Agglomerationsräume today already experience the existence of the Delta metropolis. The quick connection between the Ruhr area and the rest of the world is usually made via the Mainport of Schiphol Amsterdam; drug addicts from Lille travel to Rotterdam to score a line of coke and shoppers from Arnhem and Nijmegen increasingly frequently turn to Oberhausen, the city with the largest shopping mall in Western Europe.

3.4 Open areas as growth centres

The growth of the Delta Metropolis will be mainly noticed in the intermediate (rural) spaces. Verkennis and Groenewegen (1997) mention the pressure that extends from two directions: the region between the eastern wings of the Dutch City Belt and the western part of the Ruhr area. The recent perspectives that are imputed in North Rhine-Westfalen to establish a new regional commercial airfield on the previous military airbase, Laarbruch, just across the border near the Limburg town of Bergen, speak for themselves.

In the Belgian-Netherlands borderland the situation differs because historically the border between the provinces of Limburg and Brabant has played a less significant role, and the foundation of the Benelux has consolidated this conception. In particular numerous

borderlands in the rural areas of Neurocity, regions with a relatively low population density, will experience a rapid development of the intermediate spaces, especially nowadays when borders are becoming increasingly non relevant.

The realisation of the Westerschelde tunnel in the Province of Zeeland will mean the end of numerous cull-de-sacs in this region and boost transport infrastructure, a process which will again be followed by an intensified spatial development. Harbour and industrial developments, green houses, intensive pig farming, extension of town areas, intensification of recreation and tourism practices, as well as important ambitions in the field of nature development, will all put an enormous claim on the land that is expected to be released from traditional farming practices.

In these transnational open spaces the transition of the traditional rural areas into urban space forms the main problem and is manifested not only when urban functions move to the countryside, but also when rural functions industrialise and new functions that need the wide environment of the urban concentrations develop.

In all these examples the areas mentioned are originally green areas, that appear in first instance to be peripheral on maps. From an international Neurocity perspective however, these areas show the same problems as the Dutch Green Heart. Solutions to the problems vary, but pursuing a too narrow national perspective will undoubtedly lead to uncontrolled suburbanisation and loss of open space and spatial quality.

3.5 Industrial farming as a driving force behind spatial development policies

Historical records often refer to the so-called agro-industrial complex which formed the basis of the Golden Ages in the Seven United Provinces. The American historian Wallerstein (1980) writes:

> 'If it is to be asserted (…) that the Netherlands was the first country to achieve self-sustained growth, it is primarily because no other country showed such a coherent, cohesive and integrated agro-industrial production complex.'

Today's extension of this complex across the borderlines can be seen as another important part of the development of the Delta Metropolis. An example is the green house centre that is developing in the Netherlands, Flanders and Northrhine-Westfalen, and which as such competes with other European centres in Brittany, Spain and the southern France (Allebas et al., 1996). The same occurs for the intensive pig farming in the eastern and southern parts of the Netherlands and in Flanders (Bolsius, 1992).

The further development of industrial agriculture, especially the non land-dependant industrial dairy farming (Van Eck et al., 1996) forms an important key for rural development of the whole area, resulting in a powerful agrarian sector, which will allow current farms a sustained and ongoing development. Further growth of industrial agriculture is also necessary in order to find solutions for the environmental problems that beset agriculture. Since this growth takes place in a limited part of the available green space, some of it might become available for space-demanding developments in the field of housing, recreation, nature and water management, possibly in combination with more

extensive use of agricultural areas. At the same time agricultural development would not be hindered.

Figure 3.5 Synthesis map of spatial vision for the Benelux countries (1996)

3.6 Transnational spatial planning required

In the Spatial Vision for Benelux (Structuurschets Benelux, 1996) many of the above described perspectives and problems are acknowledged. Open spaces, for instance, are identified on the synthesis map with their preferred spatial structure (figure 3.5). The Spatial Vision for Benelux has undeniably served as the pacesetter in focussing on these problems. But because the borders of the Netherlands, Belgium and Luxembourg still form the basis of the map, the formulation of policies is obscured because they have to address the future problems of the Delta Metropolis and the northern parts of the Netherlands, and for the Belgium-Luxembourg border area in one stroke. And at the same time the spatial

relations with Northrhine-Westfalen and Nord Pas de Calais outside the Benelux area are not taken into consideration.

To come to a realistic future perspective for the Delta Metropolis, international spatial planning in north-western Europe is absolutely necessary, and should, based on the Benelux-delta in the spatial vision, connect with the adjacent areas as mentioned.

Ten years of hard work by the 12 and later 15 European member states, in order to get the European Spatial Development Perspective (ESDP) (European Commission 1997) off the ground, has thus far resulted in numerous reports, a subsidy arrangement, devotion leading to common statements to continue the hard work, and the wish to set up an observatory, which should monitor the spatial developments in Europe (Kroese-Duijsters, 1997). While everywhere in the European Union selective co-operation according to the Schengen model has been used over the past few years to change blighted planning into productive European policies, the propagandists of one European spatial planning policy kept on track with the model of the ultimate European community of interests. The role of the Dutch National Physical Planning Agency in this matter has been surprising, because this institution has developed and propagated successfully the concept of region-specific policies for spatial planning within the Netherlands.

In the vacuum of European Spatial Planning an alternative co-ordinator has turned up, one that would like to contribute from an other point of view. The European Commission reckons it to be her task to contribute top-down to an international tuning of the Centre Capital area as a whole. This development will cause the tuning of north-western Europe to become the outcome of European politics, with the European Commission as a puppet of 15 and later 20 member states determining the agenda for the area. In addition, the question is whether the interests of the existing megacities London and Paris are not conflicting with the interests of integration processes in the polynuclear Delta Metropolis.

From well understood (self)interests the Dutch Spatial Planners and their Northwestern European colleagues should rather pick up the thread that remained after the publication of the Fourth Scheme on Spatial Planning and for which the second Spatial Vision on the Benelux' forms a proper starting point: the bottom up approach of developing a Spatial vision for Northwestern Europe, from which initially the co-operation with Northrhine-Westfalen, Flanders and the region around Lille can uplevel the future perspectives of Neurocity to a truly and stylish Delta Metropolis. The co-ordinated development of the urban centres within the Delta Metropolis and of the corridors between them would have to be the main goal of the spatial vision.

The ESDP offers possibilities and a subsidy (Intereg IIC) for such an intensification of European unification but it would also mean a fruitful co-operation between partners of equal merit and mind, compared to the different planning views between northern and southern European states. As such it would also mean a great impulse to European spatial planning as a whole. In the perspective of the European unification it would mean the logical continuation and development of a number of principles with which the Dutch Spatial Planning grew up, such as the strongly decentralised policies, the compact city policy and the restrictive policy with respect to open areas.

Within the framework of this vision for the area as a whole, concurrently two types of project oriented policy could be set up, in order to keep speed in the process and to

inspire the idea bottom up. There is a need for numerous across-border cases in which a limited number of sectoral problems are being addressed. I mention two examples by way of illustration: The Rhine Schelde area with developments of harbour and industrial sites, industrial farming and watermanagement. And the area between Arnhem and Nijmegen on the one hand and the Ruhr area on the other hand side, where incorporation of infrastructure for transports of goods (water, rail, and air) is the main issue.

In addition an approach can be used that has been developed recently by the RPD in co-operation with German and Danish colleagues and which has acquired its own position in INTEREG 2C subsidy: the SCOPE approach (Working Group SCOPE, 1997). In SCOPE the transnational co-operation between areas, that do not border but that have similar problems, is organised. From here knowledge and planning concepts can be exchanged, and common action can be taken, for example directed towards co-operating national governments or the EU. The most striking example of a SCOPE theme in north-western Europe is of course the problem of the transnational open spaces, but there are others as well, such as the flooding problems along large rivers and the conservation of small scale landscapes or the reconstruction of industrialised pig farming.

Finally, the existing co-operation within the Benelux may also lead to a simple division of labour for this planning scheme, extrapolated from the autonome directions of developments that already exist: the southwards oriented development of the Flemish cities of Antwerp, Gent, Brugge and Brussels requires an intensified co-operation between Flanders and the Lille region. The eastward bound expansion of the Holland Randstad and the pressure from both the western cities of Holland and the Rhine-Ruhr area on the open spaces in between, should lead to an intensified co-operation between the Netherlands and Northrhine-Westfalen.

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4. Rural land use in Perspectives: the feasibility of physical planning scenarios

Roland Goetgeluk and Kees Schotten

Abstract

Planning the future spatial order of the Netherlands involves a growing number of different stakeholders. Therefore the National Physical Planning Agency of the Ministry of Housing, Spatial Planning and the Environment used interactive planning to trigger new ideas for spatial order of 2030. This resulted in four designs: the Spatial Perspectives. The next step is to analyse the feasibility of the designs.

This contribution deals with the future countryside. It is largely owned and used by the agricultural sector. Its future depends on the choices of farmers given their opportunity structure. In the contribution this structure depends on an widely used economic scenario of the Dutch Central Economic Planning Bureau, which quantifies the future state of the Netherlands in Europe, and on expected Dutch ecological and nature conservation policies. The economic scenario is similar for all designs, but the policies differ. The Dutch Regionalised Agricultural Model (DRAM) quantifies the claims for land for agriculture and nature conservation for a limited number of regions. This serves as input for a Geographical Information System: the Land Use Databank. It allocates the DRAM-claims and urban claims for land on the spatial level of 500 by 500 meter.

4.1 Introduction

In the 'The Empty Land, The Spatial Order Between 1789-1848' Van der Woud (1987) depicts how the former Republic of Seven Provinces changed into the nation-state the Netherlands in the turmoil of a new Europe. This development involved the growing integration between urban and rural life, urban and rural land use, the first signs of integrative planning and the government as a planner. Nowadays some describe the Netherlands as an empty urban region or urban field (Van der Velden and Wever, 1995). Van der Wouds urban-rural dichotomy disappeared in functional and mental sense as described by Knippenberg and De Pater (1988). Morphologically the rural-urban dichotomy is becoming fuzzy. Driessen et al. (1995) even postulate that rural regions (the country-side), were the area of production for agriculture, but are the areas of production and consumption for many human activities like housing, recreation, commuting, industry, services and nature.

Two hundred years later the policy question raises how the scarce mode of production and consumption, rural land, can be used optimally in the nearby future. The National Council for Agricultural Research (1988) and the National Physical Planning Agency of the Ministry of Housing, Physical Planning and the Environment (1998) postulate four major questions. How must we develop rural areas given a growing internationalisation (Euronalization) of the economy, demography, thoughts etcetera? How

can we maintain liveability of multifunctional regions? How can we manage the growing interrelations between the town and countryside given the weaker position of agriculture? How can make long-lasting tradeoffs between the demands of all stakeholders?

The answers are difficult to find, but politicians and policymakers have to make choices. Many of these choices are strategic if 'the selection of current actions is made only after a formulations and comparisons of possible solutions over a wider field of decisions relating to certain anticipated as well as current situation' (Friend and Jessop 1996, sited by Geertman 1996). Often these are spatial choices. Kreukels (1979, sited by Geertman 1996) argues that spatial planning is strategic policy oriented at the spatial order that serves the social-cultural and social-economic order. Given the huge investments, the durability of the investments, the creation of opportunities and restrictions for households and entrepreneurs by the new spatial order and the growing number of stakeholders, the choice-process has become extremely difficult. This demands for new planning procedures and models.

To facilitate this choice process the National Physical Planning Agency started the discussion on the possible futures of the Netherlands. The results will be codified in the Fifth National Physical Planning Report (phase 1). Many futures are assumed. The assumption seems valid since the future is a function of an inherent continuity (for instance preference functions of agricultural entrepreneurs or housing consumers), design (physical planning) and unknown or exogenous events (wars, plagues, massive migration, collapse of financial markets) (Van Doorn and Van Vught 1981). The first research question was to detect new forms of design (Spatial Perspectives, RPD 1997). Instead the present concept of the Compact City (no urban sprawl), four new designs were assigned as being important. They will be discussed later. The second research question was whether the Spatial Perspectives can be realised given the inherent continuity and unknown events or to what extent the futures can be achieved. The last question is which of the valid alternatives is the most acceptable.

The second research question is the central issue in this article. The article summarises a nearly finished study by the Agricultural Economics Research Institute (LEI) and the National Institute of Public Health and the Environment (RIVM) for the National Physical Planning Agency (RPD). The study aims to gain more insight in the effects of the different Spatial Perspectives on the rural land market as well as the options for new policy-instruments that may stimulate the positive and restrict the negative effects. It is triggered by the criticism that the validity of the Spatial Perspectives depends largely on the choices farmers make since they own most rural land (figure 4.1).

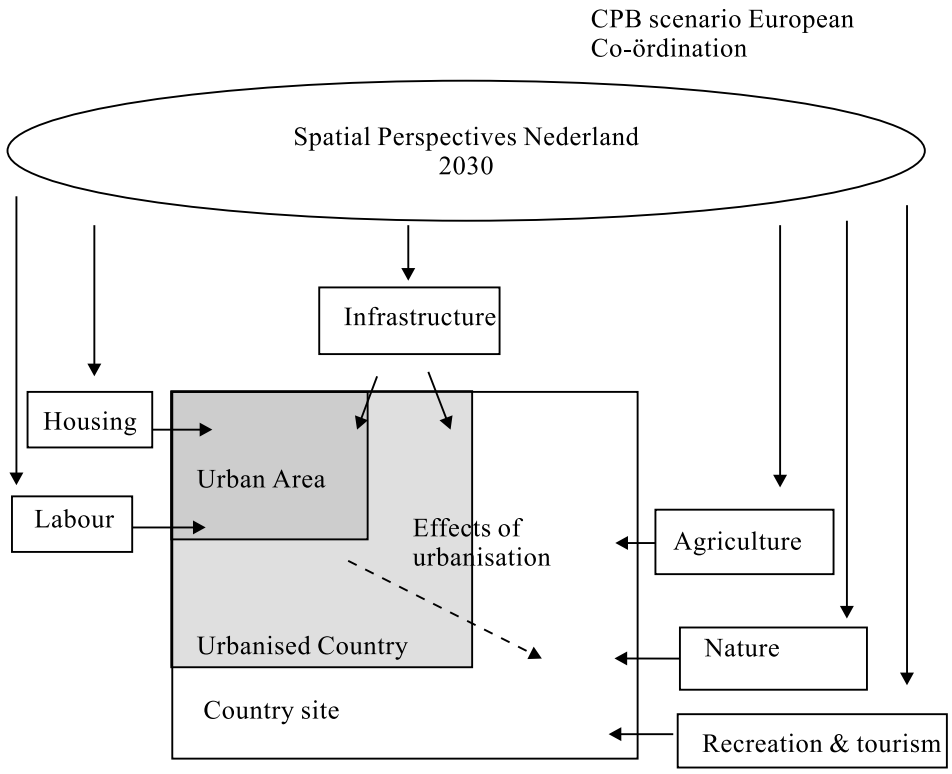


Figure 4.1 Domain of the study

The structure of the article is as follows. Section 4.2 summarises the Spatial Perspectives. This entails maps and the assumptions behind them. Section 4.3 describes the research design. Two models, DRAM and the Land-Use-Planner are linked. The Dutch Agricultural Regionalized Model (LEI) estimates agricultural land use claims and agricultural land prices at the spatial scale of 14 regions. The Land-Use-Planner (RIVM) allocates these claims as well as other spatial claims (nature, housing) on the spatial scale of 500 by 500-meter (grids). In section 4.4, the results are presented. The last section describes to what extent the National Physical Planning Agency has made feasible plans.

4.2 The Spatial Perspectives

In 1997 the National Physical Planning Agency presented the discussion report 'Nederland 2030 Spatial Perspectives' to start the discussion on possible futures of the Netherlands. The results will be codified in the Fifth National Physical Planning Report (phase 1 decision of the government). A Spatial Perspective is a coherent vision on the qualitative and quantitative aspects of land use in the future for the Netherlands in the 21st Century. Four following spatial Perspective were assigned to be fruitful to be analysed further (figure 4.1).

Palet (Palette)

The central concept is a maximum of government deregulation. This implies a minimum of restrictions for the allocation of building sites for industry, services and housing. Consequences are high urban land use claims and urban sprawl. Agricultural activities are capital and knowledge intensive. Given the urban sprawl, areas dominated by rural land use are scarce. In the neighbourhood of urban conurbations, agriculture is multifunctional especially if the landscape is attractive for consumption purposes as recreation. In nature conservation emphasis is on daily used nature by men.

Parklandschap (Parklandscape)

The central concept is a partial deregulation of government. A mosaic of urban and rural land-use in which the Dutch cultural landscapes structure future land use. A substantial part of the agricultural enterprises are multifunctional, but also gain revenues from nature- or water conservation. There are opportunities for nature conservation if the emphasis is on stimulating the present identities of the cultural landscapes and biodiversity.

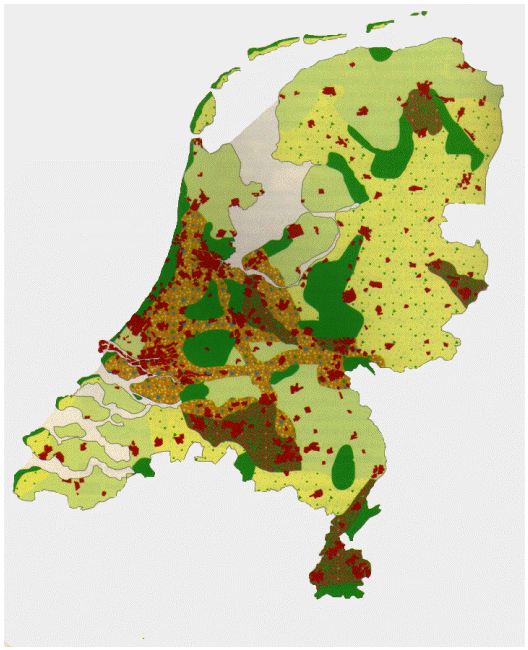
Stromenland (Landscape of traffic and water flows)

Flows of traffic and water are the structuring elements in physical planning. Urban areas and horticulture are located near infrastructure. Nature conservation depends on clean water. Intensive livestock farming is found on sandy soils in the Southern and eastern parts of the Netherlands are restructured to minimise the nitrification of the soil and drought problems.

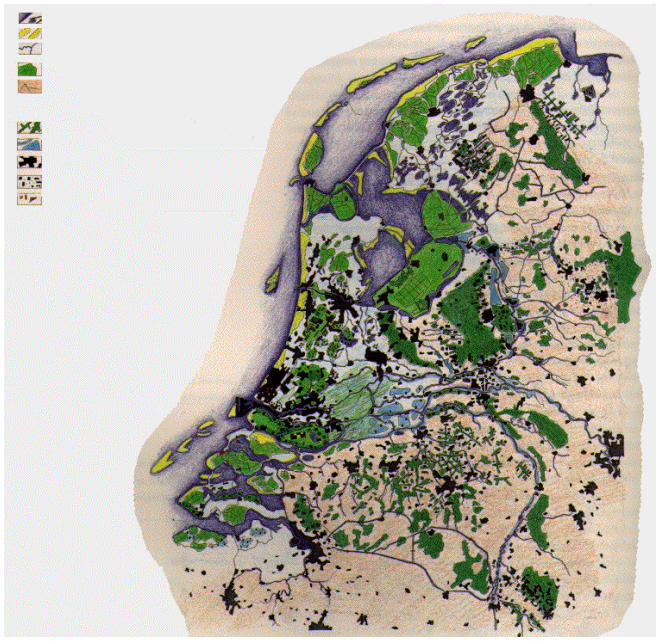
Stedenland (Landscape of cities)

Government influence on the allocation of activities is strong. The present physical planning doctrine is continued and strengthened. This results in a sharp boundary between urban, rural and nature areas. The ongoing urbanisation of the rural areas must be stopped. Next to large-scale nature conservation for the improvement of biodiversity, nature for daily usage is planned near urban centers.

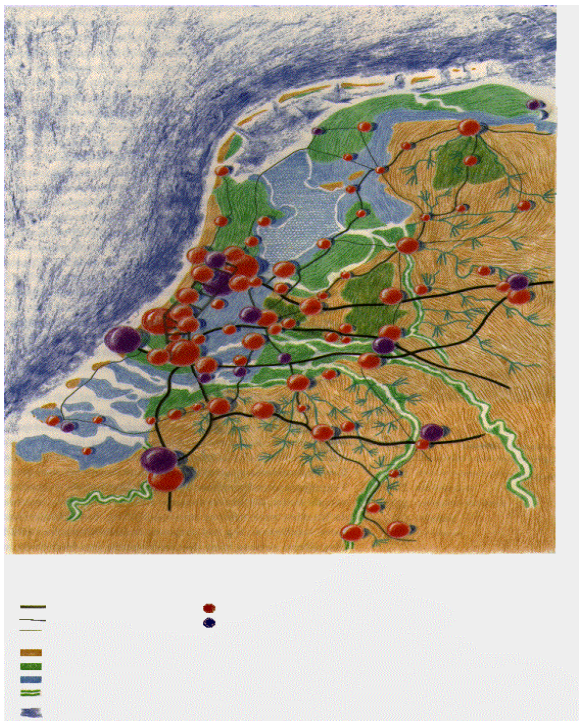
The Ministry of Agriculture, Nature Management and Fisheries developed new spatial and administrative ideas about the rural and urban land use in the Netherlands. Rural areas are used for agricultural production as well as other modes of urban and rural land use. The Ministry adapted the concept of the Green Metropolis.



Palet



Parklandschap



Stromenland

Stedenland

Figure 4.2 Spatial Perspectives

4.3 Research design

To what extent are the four designs feasible? A four stage-research design was chosen. Firstly, global integrative long term (1995-2020 scenarios of the Netherlands Bureau for Economic Policy Analysis were used. Based on three schools of economics (Schumpetrian, Keynes, Neo-classical) dominant non-controllable factors were determined. The CPB estimated e.g. spatial claims for housing, industry, services, infrastructure, and agriculture in the Netherlands. Secondly, these assumptions and model results serve as input for specialised sector models such as models for housing consumption and agriculture.

In our study, we used a model (DRAM) of the Agricultural Economics Research Institute. DRAM delivers agricultural claims and land prices at the spatial level of 14 agricultural regions. Thirdly, these agricultural claims were confronted with other regionalized claims for housing, industry, and nature conservation. The model used is the Land Use Databank of the National Institute of Public Health and the Environment. The model clears the land market and allocates the claims at the level of 500 by 500 meters (grids). Finally, we compared the results with the Spatial Perspectives of the National Physical Planning Agency. This research-design enables us to test whether the perspectives are robust as indicated in the introduction. Figure 4.3 shows the research design.

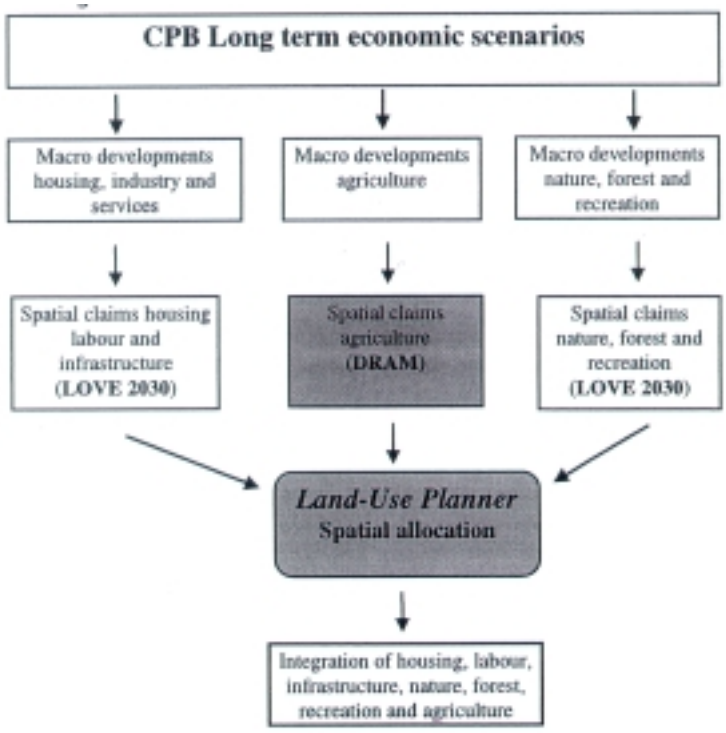


Figure 4.3 The research design

The Long Term scenarios

The three scenarios have been labelled: Global Competition, European Co-ordination and Divided Europe (figure 4.4). Although the context scenarios are important, present and intended policies determine also the future of rural areas (Luijt 1997). Dutch government, for example, has developed the idea of the Ecological Main Structure (EHS) to develop natural biodiversity by means of allocating extra 150.000 hectares in rural areas. Regardless of the economic perspectives of the context scenarios the EHS will influence demand and supply. Taken into account is that approved policies regarding Physical Planning (actualisation Fourth National Physical Planning Report 1996) will be realised in 2010. This implies that the Spatial Perspectives will only be valid after 2010 until 2030.

Indicators	GC	EC	DE
International economics-political developments	* Market dominance * Internationalisation * Efficiency * Flexible integration EC	* Co-ordination * Equity important * Parallel developments	* No market co-ordination * Disunity in EC
Technological Developments	* Rapid growth know-ledge base * Diffusion of knowledge optimal * IT all persuasive * Market oriented	* Rapid growth knowledge base * Diffusion sub-optimal * Society oriented	* Demand for knowledge * No efficient diffusion
Social-cultural developments	* Global villager * Individualisation * hedonism	* European or region-dweller * Solidarity * Immaterial aspects, solidarity	* Nationalism, intolerance * No quality demand
Demographic developments	* No fundamental changes * Net-migration low * Moderate fertility/life expectancy	* No fundamental changes * Higher due to solidarity * Both higher	* No fundamental changes * Lowest * Lowest
Economy	* Rapid growth GNP * Netherlands: 3,25%/year * Private consumption raises and Product differentiation raises * Product structure dynamic * Economic order bases on neo-classical theory: comparative cost benefits * dominance of middle and high valuable products * Coupling income and benefits * Low unemployment * Flex-working	* EC and Asia winners * Netherlands: 3% /year * Private consumption raises, but ecological/societal orientation * Less international competition * International ecological policy * More collective services * Coupling income and benefits * Higher unemployment * Flex-working less	* USA and Asia winners * Netherlands: 1,75% /year * Growth private low consumption * Low dynamic in Production structure * No coupling income and benefits (budget) * High unemployment

Figure 4.4 Description of the three CPBscenarios for 2020
Source: RPD 1996.

DRAM

The Dutch Regionalised Agricultural Model (DRAM Helming 1997) is used to estimate the agricultural claims and land prices at the level of 14 agricultural regions. DRAM is a sector model. Helming (1997) argues that given the many uncertainties of the future a

sector model is more suitable than micro-simulation model of individual farmers. Unknown assumptions regarding individual behaviour do not have to be made.

The choice function is the maximisation of national agricultural balance (national benefits minus the variable costs). Fixed costs for capital and labour are not inputs because for the availability of these modes of production are unlimited for the sector as a whole. The production capacity (land, of a bankrupt individual can be bought by other farms in the sector. The choice function however is based on data of actual and intended choice behaviour of the Dutch farmers. These data are collected and analysed by the Agricultural Economics Research Institute.

DRAM optimises the national agricultural difference between costs for inputs and prices for outputs (balance). In the model structure, account is taken of assumptions regarding external factor. These assumptions include at which level the market clears (European, National or regional), which inputs and outputs are fixed priced (elasticity of supply and demand), the impact of the common agricultural policies of the EC, environmental policies, the level of technology and the agricultural market for inputs and outputs. These external variables are mostly based on the Long Term Scenarios and additional assumptions regarding the match between the Spatial Perspectives and the Long Term Scenarios (see next section).

The model estimates how the national and regional market prices change due to changes in national and regional demand and supply of inputs and products. The model estimates prices for the inputs land, quota (milk, manure), manure, stock and food. The estimated prices are marginal prices [1]. These inputs (except land) can be traded inter regionally. The regional marginal price for the inputs is a function of the regional markets as well as the national market. The difference between regional marginal prices reflect the costs of transportation and/or transactions.

For our study DRAM is a flexible instrument to analyse the market for agricultural land more precisely based on an economic theory of choice. Some of the results, the demand for land for crops and stock are input for the last model: The Land Use Databank.

The Land Use Databank

The assumption behind the Land Use Databank is that one integrative dynamic model for all kinds of land use claims is too complex to model (Schotten et al., 1997). The solution is to assume that the regional claims of the Netherlands Bureau for Economic Policy Analysisand specialised sector model DRAM are theoretically valid estimated. The Land Use Databank allocates these regional claims and visualises them in maps. The allocation results in the possibility of all land use claims per grid op 500 by 500-meter.

The model is a sophisticated Geographical Information System (Timmermans 1998). How are the different regional claims for housing, industry, services, nature, recreation and agriculture matched on the regional land markets? This theoretical fundament of the Land Use Databank is economic hedonic pricing (Timmermans 1998). This implies that the

[1] The price of one extra unit input is compared to the growth of the national agricultural balance. Many different forms of input are possible such as buying land, animals of quota. The input with highest national revenue is the optimal input. However, the demand for an input has impact on its price. So, finding the equilibrium is more complex and demands different model-runs.

choice is a function of finding and pricing the most attractive grids for the given activity. The allocation is based on three rules:

- the first rule is that the claims are reproduced by the model. This implies for instance that the sum of the allocated DRAM claim of dairy farming over all grids per region must equal the regional claim for dairy farming;
- the second rule is that the allocation is based on the attractiveness of each grid for each form of land use. The attractiveness is based on the present land use, government physical planning design that overrule the land market, the physical opportunities and restrictions and of course location preferences of housing consumers, entrepreneurs like farmers. This implies for instance that the transformation of urban land use into rural land use is fairly impossible due to the high transformation costs, the assigned locations for nature conservation or building sites (Spatial Perspectives), the soil quality for agricultural land uses (fixed rules) and the preference of suburban housing (Spatial Perspectives);
- the last rule is the market-clearing procedure. Let us assume that the attractiveness for a grid is equal for horticulture and nature conservation. Let us assume that the regional claim for horticulture is half of the regional claim for nature conservation. Given the assumption that the regional claims have to be realised, the willingness to pay for nature conservation is twice as high as for horticulture. In other words: the marginal benefit for nature conservation is twice as high as for horticulture. Hence, the grid is assigned for nature conservation.

4.4 Results

DRAM

The period before and after 2010 is distinguished. Before 2010 present and intended policies, as described in the Fourth National Physical Planning Report (VINEX) will be realised. The spatial claims for each of the Spatial Perspectives are identical. After 2010 the spatial claims differ as a consequence of the Long Term Scenarios and the Spatial Perspectives. Since the emphasis is on evaluating the effects of each of the four Spatial Perspectives the Physical Planning Agency allowed us to use only one Long Term Scenario: European Co-ordination. Some additional assumptions have to be made to estimate how the agricultural sector will act after 2010. These assumptions are depicted in figure 4.5.

	National policy regarding manure and ammonium according to present and foreseen policies	National policy regarding manure and ammonium based on the equilibrium between plant uptake and manure dressing.
Realisation of the spatial claims for housing and working areas. Natural areas are realised independent of the market prices for agricultural land		Stedenland Stromenland
Realisation of the spatial claims for housing and working areas. Natural areas are realised dependent of the market prices for agricultural land	Parklandschap (price paid for natural areas based on the 1993 - 1996 market prices) Palet (price paid for natural areas based on two-times the 1993 - 1996 market prices)	

Figure 4.5 The realisation of natural areas and the environmental policy regarding manure and ammonium assumed for the perspectives.

In all perspectives the claimed housing and working areas will be realised because these land use types are willing to pay much higher prices than paid on the agricultural ground market.

In the perspectives Stedenland and Stromenland, both perspectives with a strong national government, the planned natural areas will be realised by the government independent of the price paid.

In the perspectives Parklandschap and Palet market forces, including the market for land, play a major role and the amount of natural areas realised depends on the market prices that the (non) governmental organisations are willing to pay to convert agricultural land into natural areas. In Parkland is assumed that the price paid by (non) governmental organisations is the same as paid in the period 1993-1996 while in Palet this price has been doubled.

Also the national environmental policy regarding manure and ammonium depends on the perspectives. In Parklandschap and Palet the present and foreseen policy regarding manure and ammonium will be realised. In Stedenland and Stromenland the manure dressing for each crop may not exceed the uptake of nutrients by that crop, resulting in an extra decrease of the numbers of livestock in these perspectives (figure 4.5).

Above assumptions lead to the following national claims for non-agricultural uses (table 4.1). These claims are input for DRAM as well as the assumptions stated in figure 4.5 (table 4.2). The decrease in production per hectare in the perspectives Stedenland and Stromenland causes a significant decrease in the net income per hectare for the arable land use types as can be seen in the regions where *traditionally arable land-use types dominate* (Noordelijk Zeekleigebied, IJsselmeerpolders). Also striking is the increase of the net income per hectare of the sandy regions (Zuidelijk and Oostelijk Zandgebied) in the perspectives Palet and Parklandschap.

Table 4.1 Spatial claims of the four spatial perspectives in the period 1995 - 2010 and 2010 - 2030 (in hectare)

		2030			
	2010	Palet	Parklandschap	Stromenland	Stedenland
Housing	30,000	39,018	37,673	37,000	33,636
Industry and services	11,000	11,550	11,220	11,550	10,780
Infrastructure	4,600	1,569	1,631	1,600	1,600
Natural areas, forest and Recreation	94,000	62,820	70,480	70,538	70,590

In the perspectives Parklandschap and Palet the amount of natural areas (including forest and recreation) realised depends on the prices paid for agricultural land. Although the income derived from a hectare increases in all perspectives, the market prices for natural areas are generally too high for the conversion of agricultural land into natural areas as can be seen in table 4.3. For Parklandschap (where the price paid for agricultural land is set at the level of 1993-1996) in none of the agricultural regions conversion into natural areas can be realised. In Palet (where the price paid for agricultural land is two times that is set at of the level of 1993-1996) only in the regions Veenkoloniën and Noordelijk Zandgebied natural areas can be realised.

Land Use Databank

As mentioned earlier the attractiveness of a grid for all forms of land use is needed to allocate the claims. Table 4.4 shows the rules that were used to determine the attractiveness of a grid. These rules reflect present land use, physical plans, physical opportunities and restrictions and location preferences of farmers and housing consumers etcetera. As mentioned earlier the attractiveness is different for the period before 2010 and after 2010. Hence, coherency exists between the DRAM and the Land Use Databank input.

Table 4.2 Net income in 1995 and in the 2030 for the four spatial perspectives (prices in guilders per ha)

Agricultural region	1995	Palet	Parklandschap	Stedenland	Stromenland
Zuidelijk Zandgebied	2862	3104	2995	4536	4487
Noordelijk Zeekleigebied	1972	2215	2133	2903	2860
IJsselmeerpolders	1773	2589	2536	2621	2463
Zuidelijk Zeekleigebied	1570	2017	2014	2249	2297
Rivierkleigebied	1025	1557	1449	2782	2724
Noordelijk Weidegebied	2011	2166	2048	3396	3411
Westelijk Weidegebied	1461	1940	1824	3058	3104
Noordelijk Zandgebied	199	1084	869	1860	1927
Oostelijk Zandgebied	2630	2885	2765	4499	4503
Centraal Zandgbied	2298	2888	2772	4932	5068
Lössgebied	2182	2800	2795	3423	3343
Veenkoloniën	338	1084	646	622	682
Overig Noord-Holland	213	2230	1645	2744	2541
Overig Zuid-Holland	976	3383	3243	3987	4057
Nederland	1714	2204	2067	3121	3125

Table 4.3 Nature development per agricultural region for the spatial perspectives in the period 2010 - 2030 (in hectares)

Agricultural region	Palet	Parklandschap	Stedenland	Stromenland
Zuidelijk Zandgebied	0	0	7,722	1,648
Noordelijk Zeekleigebied	0	0	6,991	1,358
IJsselmeerpolders	0	0	9,256	2,999
Zuidelijk Zeekleigebied	0	0	12,096	19,845
Rivierkleigebied	0	0	7,363	3,858
Noordelijk Weidegebied	0	0	7,123	9,657
Westelijk Weidegebied	0	0	6,642	11,064
Noordelijk Zandgebied	9,188	0	2,180	7,605
Oostelijk Zandgebied	0	0	0	126
Centraal Zandgebied	0	0	6,614	9,440
Lössgebied	0	0	1,954	421
Veenkoloniën	9,976	0	356	1,763
Overig Noord-Holland	0	0	2,298	664
Overig Zuid-Holland	0	0	0	0
Nederland	19,164	0	70,595	70,448

Source: DRAM simulations

Figure 4.5 shows dominant land use in the Randstad-Holland for the reference situation and each of the four Spatial Perspectives. To what extend does the countryside change in the four perspectives? The maps show that the agricultural land use remains the major land use in the countryside. This, however does not imply that housing, labour and recreation do not take place in the Green Heart. For instance in Stedenland, we see a growth near the Drechtsteden (South east of Rotterdam).

Also quite visible is the change of arable land into pasture (near Boskoop) which will be explained in the last section. Compared to the reference situation we see a growth of natural areas in all 4 perspectives. In Parklandschap and Palet this is only the result of the current policy to establish green zones in the Randstad. In Stedenland extra natural areas are found in the neighbourhood of the great conurbations and the lake IJssel. In Stromenland these extra areas are found in the lower areas and in the neighbourhood of waterways.

Table 4.4 Physical planning rules used in the Land Use Databank for 2010 and the four spatial Perspectives

	Land-use type	The physical planning strategy
1995 - 2010	Housing	In VINEX locations
	Industry and services	In VINEX locations
	Infrastructure	New and foreseen new infrastructure
	Natural areas a)	In areas earmarked by the current natural policy
	Greenhouses	In areas earmarked by the current agricultural policy
	Agriculture	In areas with good soil and groundwater properties and near existing concentration areas
Stedenland		
	Housing	In VINEX locations and near present built up areas
	Industry and services	In VINEX locations and near present working areas
	Infrastructure	New and foreseen new infrastructure
	Natural areas a)	In the proximity of urban areas and near big waterbodies
	Greenhouses	In areas earmarked by the current agricultural policy
	Agriculture	In areas with good soil and groundwater properties and near existing concentration areas
Stromenland		
	Housing	Near infrastructure
	Industry and services	Near infrastructure
	Infrastructure	New and foreseen new infrastructure
	Natural areas a)	In the proximity of waterways
	Greenhouses	In areas earmarked by the current agricultural policy
	Agriculture	In areas with good soil and groundwater properties and near existing concentration areas
Parklandschap		
	Housing	Near present and foreseen natural areas and in beautiful landscapes
	Industry and services	Near present working areas
	Infrastructure	New and foreseen new infrastructure
	Natural areas a)	-
	Greenhouses	In areas earmarked by the current agricultural policy
	Agriculture	In areas with good soil and groundwater properties and near existing concentration areas

Palet		
	Housing	Near present and foreseen natural areas, transitions in landscapes and infrastructure
	Industry and services	Near present working areas and infrastructure
	Infrastructure	New and foreseen new infrastructure
	Natural areas a)	Near the transition of high and low landscapes in the North
	Greenhouses	In areas earmarked by the current agricultural policy
	Agriculture	In areas with good soil and groundwater properties and near existing concentration areas

a) Natural areas, including forest and recreation.

VINEX location, including sites in actual urban settlements plus new sites in present arable land

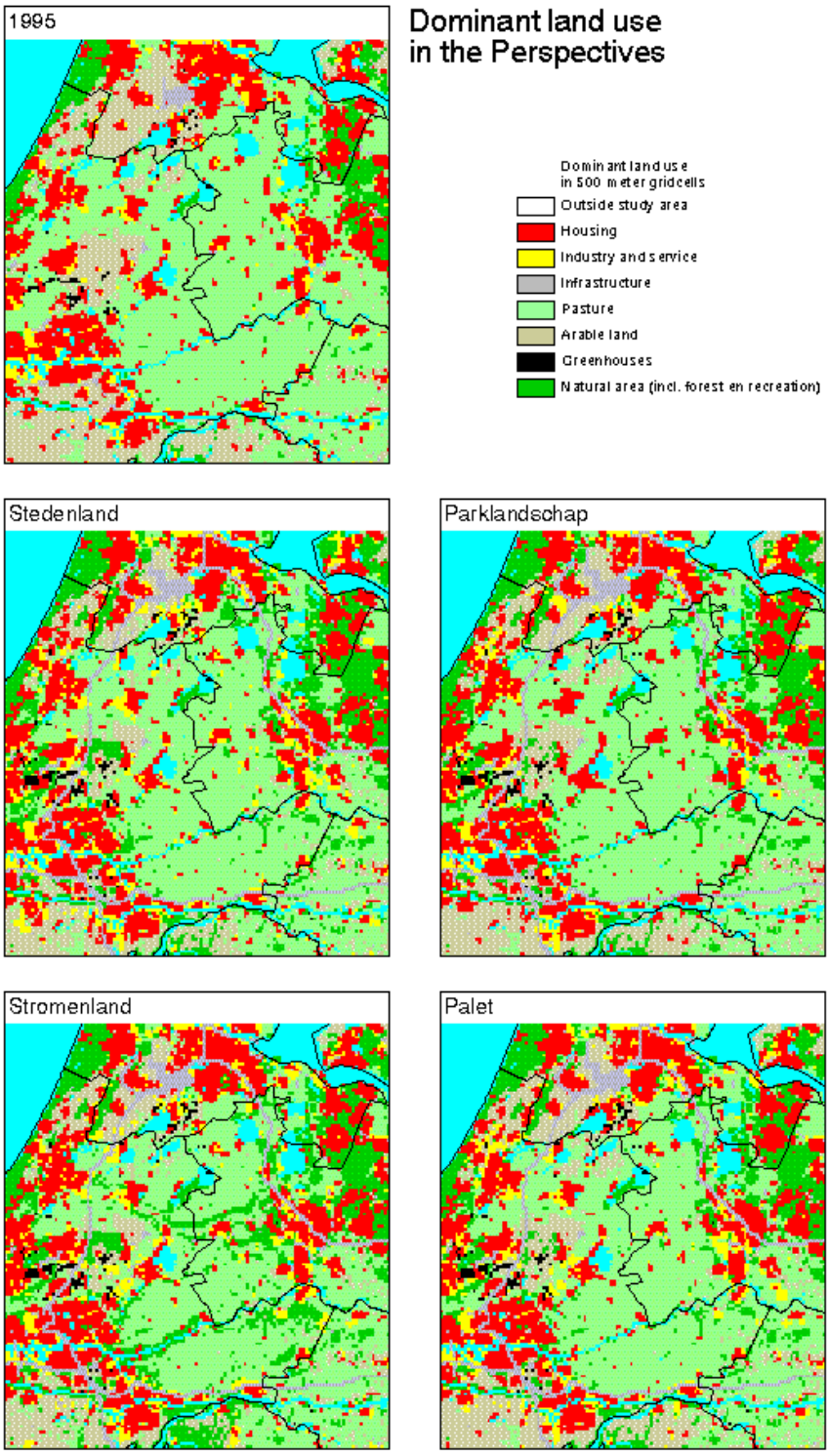


Figure 4.5 Dominant land use in the 4 Perspectives and the present land use 1995

4.5 Conclusions

The goal of the study was to check whether the Spatial Perspectives are feasible. What are the conclusions of the modelling efforts with DRAM and the Land Use Databank? In this conclusive section we evaluate the results from the viewpoint of the policy-makers.

Palet

In the period 2010-2030 the land mobility is large. Farmers will relocate their businessess and this will also lead to raising prices in those areas where agriculture dominates (North-eastern parts of the Netherlands). Louwers (1997) for instance estimates that relocation implies an extra demand for land of approximately 50%.

For agriculture the implications of the Spatial Perspectives are severe. Not only is the amount of available land reduced, the land prices are approximately 30% higher than in the year of reference. Extensive agriculture is not possible anymore, but biological agriculture is feasible. In the Spatial Perspective only one land market exists. It is dominated by the demand for housing and working locations. The opportunities for green areas nearby these locations seem to exist in theory. Seems, since the reduction of green zones is a consequence of the decline of agriculture.

The central government has a very limited role in clearing the markets for different land uses. The results indicate that additional policy rules are needed. For instance the allocation of land for nature conservation is not realised since other land use forms have a stronger purchasing power. Since nature has many collective characteristics it is difficult or even impossible to exclude citizens from free riding effects. Further, competition of the unpaid benefits is not to be expected. Therefore it seems that the feasibility of this Spatial Perspective is questionable at present. It is appropriate that the central government intervenes strongly.

If this Spatial Perspective must be achieved then many new actions must be taken. First of all, the government needs to enlarge the budget of the present Program Management (Ministry of Agriculture, Fishery and Nature). This conclusion was also drawn earlier by Luijt (1997) and resulted recently in an enlarged budget. Secondly, private-public partnerships is an option to enlarge the concept (Red pays for Green). This concept entails the assumption that housing consumers are willing to pay for attractive and accessible green zones.

Some studies indicated that the housing prices are higher if they are located within 400 meters of a Green Zone. Since the tax-revenues for municipalities are based on housing prices, these revenues can be used for the management of these green areas. This also implies that the designs for these green zones can be optimised to influence the housing prices. New taxation procedures or even restricting building sites without these green zones are necessary.

Parklandschap

The spatial segmentation between several forms of land use still exists since the central government interferes in the markets by means of physical planning. The central government formulates global policies, but provinces and municipalities formulate regional physical plans. Between the assigned segments large differences exist between land prices. But within each segment the differences are rather small. For agriculture the prices are rather high and comparable with Palet. These prices are high in those areas where non-agricultural land uses do not exist. The reason is that relocation of farms is stimulated as a result of this new spatial order. As a result of these high agricultural land prices nature conservation is a problem. The reason is the same as in Palet.

Whether the nature conservation on agricultural land develops depends on the financial and organisation aid of the central government (taxation). It is possible to establish a local taxation for inhabitants and tourists on green and nature conservation to minimise the free riders problem. Another option is to use the extra municipal taxation benefits due to the risen prices of houses to farmers. Likewise the municipalities may claim for the construction of green zones in new building sites. This will lead to higher prices per square meter for building sites since the return per square meter is lower. A subsidy is necessary to reduce these prices to reduce the costs for housing. However, this procedure will lead to anticipation by farmers to sell their agricultural land at higher prices since the returns for green zones are higher than for agricultural use. It seems appropriate to separate the land for nature conservation from green zones nearby building sites.

Stromenland

The amount of land available for agriculture is less than in Palet and Parklandschap. This implies the rising of agricultural land prices. In this Spatial Perspective relocation of farms is necessary since all new sites for housing and industry-parks are located in the neighbourhood of infrastructure. Relocations lead to higher land prices. More important for the prices is the severe environmental policy. In general this will lead to lower land prices since this environmental policy often leads to lower revenues and for higher costs. The reason for the rise of land prices results form the assumption that a 'balance of manure exists'. Dairy-farmers, who have a milk-quotum will use this quotum totally since the gross-profits are high. This results in a rising demand for arable land to cultivate them. The prices for the crops rise. The sectors with low returns change to arable farming. Let us assume that the output of crops is not sufficient enough to maximise the milk quotum. In this case the price for the quotum will be reduced. The land prices for dairy farming will rise since land has become scarce. In that case land is scarce and this will have its impact on the prices. The consequence of Stromenland is far reaching for agriculture in a complex way. Only the sectors with a high return survive and land prices are extremely high: 80% compared to the reference scenario.

To acquire land for restructuring of the agricultural sector, infrastructure, new sites for housing and labour and nature conservation will be costly. The government can reduce prices for relocation by means of abolishing income-taxation in case a farmer stops. The opportunities for nature-conservation in combination with dairy farming grow due to the

environmental policies. This implies that a reduction of subsidies to enable this form of nature conservation is possible.

Stedenland

This Spatial Perspective resembles present policy. The area for agriculture is the smallest of all four Spatial Perspectives. This seems in contradiction with this Spatial Perspective. The explanation is that we have assumed that the area for nature conservation is realised due to the interference of the government. Comparable with Stromenland the impact of environmental policy is severe. Hence, the prices for agricultural land are high. The prices are lower than in Stromenland because the spatial segmentation does not allow for non-agricultural land uses in the rural areas.

The price to be paid to relocate farmers who own land that is planned for urban activities is high. The government also pays for nature conservation although the environmental policy enables nature conservation as we have seen in the case of Stromenland.

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5. Labour situation of farm women in rural (urban) areas

Greet Overbeek

Abstract

The main content of this paper will be based on the results of an EU-research done in 1995-1997 which analysed the labour situation of farm women in rural areas of Europe (Overbeek et al., 1998). The results will focus on an international comparison of data collected by survey among farm women in study areas in Greece, Italy, the Netherlands and Norway and on an international comparison of data in the sub-areas of the Netherlands.

The results show that agriculture is no longer a characteristic function for rural areas, because to an increasing extent there are cultivation's more determinated by a good logistic infrastructure and technical conditions than by a natural and open space. Further, trends in agriculture which provide women employment opportunities are not so much related to the diversification of farm activities, but sooner to the increase of labour-intensive cultivation's. In most study areas the marginalisation of agriculture implies that more women tend to find work outside. The realisation of this depends not only on the presence of other jobs, but also on the relevant human capital and the labour orientation of women towards the combination of paid work and care tasks.

5.1 Introduction

At the end of the 20th century, there are several trends in Europe that are influencing employment, family relations and the personal lives of women. The notions of full-time and life-time employment in one place are declining, while the gender dividing lines in the division of productive and reproductive work are changing. More women are shifting a part of their work from a domestic context into a labour market context. Rising education levels, but also the post-industrialisation of the economy, support women's claim for paid positions as dependent and independent workers. Those trends differ over time and over space and it may be asked how they influence the labour situation of women in rural areas of Europe. Few rural areas are still based on employment in agriculture, while more areas are dominated by employment in industries or in services. Further, the importance of consumption functions like living, leisure and recreation is increasing and differences between rural and urban regions areas are decreasing.

Since changes in rural areas are initiated both by the restructuring of agriculture and the expansion of other sectors, it might be asked how women working in agriculture perceive these changes and how they have coped with them. Until now, attention on the labour situation of women who are living with farmers or managing a farm themselves, often had an agricultural focus. Due to the increase of other employment, more mobility and education opportunities, and changes in social networks such a mono-sectoral approach has become too restricted.

Therefore a territorial approach of integrating agricultural and other factors will be more suitable for analysing the labour situation of farm women in rural areas. Emphasis will be given to factors at an individual level related to the restructuring of agriculture and to the expansion of others sectors of employment (section 2). To read differences between rural and urban contexts relevant for the labour situation of farm women, differences in the density of human activities will be elaborated (section 3). The results will focus on an international comparison of data collected in study areas in Greece, Italy, the Netherlands and Norway (section 4) and on an international comparison of data in the sub-areas in the Netherlands (section 5). The main content of this paper will be based on the results of an EU-research done in 1995-1997 which analysed the labour situation of farm women in rural areas of Europe (Overbeek et al., 1998).

5.2 Relevant factors influencing the labour situation of farm women

Results of other empirical research have indicated that different economic, social and gender factors explain the participation of women in the labour market. They are hypothesised to be related both to farm and external labour market structures, and to human capital, household structures and the labour orientation of farm women (Efstratoglou 1998).

Farm structures refer to the labour demand on farm, often indicated by the size and intensity of farming. The influence of farm structures is in its effect dualistic because both on small and large farms there may be a labour demand for women. On small farms, there might be an extension of domestic activities, while on large farms the number of administration, reception and service tasks might increase. External structures refer to the labour demand outside agriculture, often indicated by the number and type of jobs in the region to support the participation of women in off-farm work.

Often, it has been assumed that family members work off farm because they are pushed by factors associated with constrained farming conditions and pulled by other factors related to off-farm opportunities. However, literature on the empirical evidence of the gender division of labour on and off farm shows that those push-factors refer predominantly to the labour position of men. It are predominantly male farmers on small farms with low incomes who tend to have an off-farm job. A weaker negative relationship between farm size and participation in off-farm work has been found for women (Olfert 1993, Benjamin 1994). An explanation might be that women prepare themselves more often for a labour perspective outside and less often for a labour perspective in agriculture than men did. The consequence is that women are sooner pushed than pulled from off-farm work. This depends on the required informal and formal qualifications (human capital), household members who decrease or increase women's amount of domestic work (household structures) and women's orientation to combine motherhood with respective off-farm and farm work (labour orientation). Therefore, for women the labour perspectives on farm might be sooner a pull-factor than a push-factor.

To combine the different opportunities, it is expected that a larger farm size and a higher economic activity in the region imply more opportunities for women to realise paid work on and off farm. Dependent on the employment opportunities on and off farm there

are four options. Two options with a push-pull combination show a clear opportunity for employment on or off farm. The other two options with a push-push or pull-pull combination are supposed to have divergent results, and factors like human capital, household structures and labour orientation might be more decisive.

5.3 Typology of rural areas

Above the factors which are assumed to influence the labour situation of women on and off farm were considered at an individual level. However, in European countries rural regions have quite contrasting experiences and problems related to the level of diversification of the region (CEC 1988). Thus, the contexts where individual factors play a role are quite different if we concern the farm and labour market structures, the human capital requirements, the informal and paid care services, and the local values towards the combination of paid work and care. In the European Commission's assessment of the socio-economic challenges facing rural regions those contexts were distinguished as rural regions within easy access of large urban centres, rural regions in decline and marginal rural regions. The differences between the regions will be explained with the study areas included in the EU-research about the labour situation and strategies of farm women in rural areas of Europe.

The EU-research has been carried out in Fthiotis in Greece, Udine in Italy, four sub-areas in the Netherlands, and two sub-areas in Nord-Trøndelag in Norway (figure 5.1). Fthiotis in Greece may represent the less diversified and marginal rural regions, with mostly farming communities and informal social services. Udine in Italy and some rural regions in the Netherlands may illustrate the rural areas where progress in improving agricultural structures and diversification in the rural economy are less advanced than elsewhere. However, most rural regions in the Netherlands reflect the pressures of modern life on rural society. Nord-Trøndelag in Norway has a well developed labour market and paid care services, but is handicapped by a sparse population and difficult climate conditions. Therefore, it is not so much a rural region in decline, but sooner a region with more physical constraints.

Countries have generally developed their own definitions of rural areas. They are often based on socio-economic criteria to indicate the presence of activities. At EU-level, there is no common definition. For the location of activities within the study areas, a morphological classification of population settlements has been used, based on whether rural areas fall below defined population thresholds for urban zones. In this sense 'rural' areas are defined in a residual and negative way: rural is all that is not urban and not built up (Berlan-Darque and Collomb 1991, Saraceno 1994) [1].

According to the OECD-classification (OECD 1996), regions are classified as rural, if the population density is below 150 residents/km^2. Most study areas fit with this

[1] The thresholds adopted are markedly different between states and point to the multiplicity of rural contexts within Europe (Hoggart et al., 1995). Mediterranean definitions of rural space tend to employ high population thresholds because of their distinctive pattern of rural land use evolution. On the contrary, Nordic countries which have historically sustained dispersed, low density but demographically important rural populations, have adopted far lower thresholds for defining urban centers.

classification. Fthiotis has a population density of 39 residents/km^2, Udine 107 residents/km^2 and Nord-Trøndelag 6 residents/km^2. The classification was too narrow for the Netherlands were regions with relative more farm workers have a higher population density. In this country two sub-areas are considered 'rural' (Groningen 237 residents/km^2 and IJssel-Vecht 218 residents/km^2) and two 'urban' (North-Holland north 408 residents/km^2 and North and Central Limburg 322 residents/km^2). If a threshold below 150 residents/km^2 would have been used, rural regions which reflect the pressures of modern life on rural society and agriculture would have been ignored.

Therefore, the case of the Netherlands shows that the assumptions behind the relation between the morphological structure and the employment structure of rural regions might be discussed. As long as agriculture is based on cultivated land in the locality and there are few nature areas, the morphological structure will often coincide with the diversification of the region. Thus, less space for population settlements (lower population density) implies more employment in agriculture and land for farming (less diversification). This relationship does not hold for agricultural productions, which use less cultivated land in the locality, because they are based on externally produced inputs (like intensive horticulture and indoor livestock). In that case, which typical for the Netherlands, agricultural productions may occur more often in 'urban' regions with a higher population density, especially those regions which provide a well integrated infrastructure with external markets. In the next sections we will see that this distinction is crucial when we consider the labour situation of farm women.

5.4 Labour situation of farm women in an international perspective

There are few common indicators to measure the employment opportunities in the study areas. To indicate the labour demand on farm, it would have been useful to compare not only the size of farm productions, but also its intensity and the presence of other farm-based activities. Since there were no common indicators to measure the added value based on the intensity of farm and farm-based activities, the labour demand is indicated by the percentage of large farms with more than 20 ha. If the intensity of farm productions would have been included, in the Netherlands the labour demand would increase. The influence of farm-based activities would not have changed much, because in all study areas its contribution to the farm income was still marginal. The opportunities for off-farm work are indicated by the activity rates of residents in each area. Using those indicators, we might hypothesise the following differences (table 5.1).

In Fhtiotis there are few large farms and few economic active workers in the area, because many activities are still exchanged in an informal way. Therefore women are hypothesised to be unemployed or to work unpaid. In Udine there are also few large farms, but more economic active workers than in Fthiotis. Therefore women are hypothesised to work off farm or to be unemployed. In the Netherlands there are more large farms, but a similar number of economic active workers as in Udine. Therefore women are hypothesised to work on farm and to a less extent to work off farm. In Nord-Trøndelag, the farms are smaller, but there are more economic active workers than in the Netherlands. Therefore women are hypothesised to work off farm and to a less extent to work on farm.

Table 5.1 Employment opportunities in the four study areas and the hypothesised labour situation

Employment opportunities	Greece (Fthiotis)	Italy (Udine)	The Netherlands (N,E,W,S)	Norway (Nord-Trøndelag
Farms >20 ha	2% (Push)	4% (Push)	38% (Pull)	19% (Push-Pull)
Regional activity rate	35% (Push)	61% (Push-Pull)	61% (Push-Pull)	75% (pull)
Hypothesis	Unemployment (unpaid work)	Off-farm work (unemployment)	Farm work (off-farm work)	Off-farm work (farm work)

Source: Overbeek et al., 1998.

To compare the labour situation of farm women with a quite different intensity of income generating activities on and off farm, a classificatory variable has been used. Based on the labour input of women in income generating activities on and off farm, four groups have been distinguished for each study area:

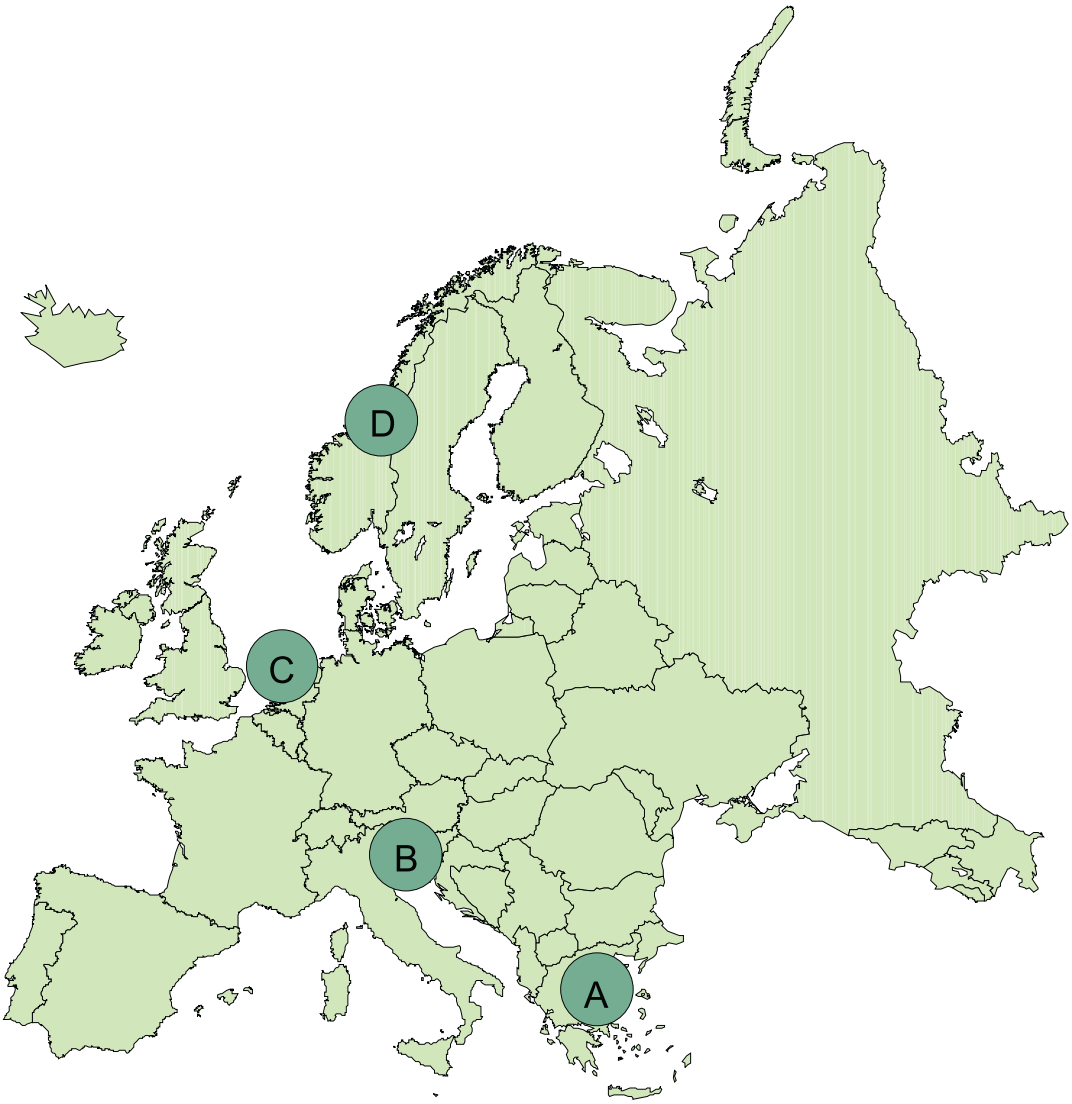
- mainly working on farm (more than 50 days/year or 8 hours/week farm work);
- mainly working off farm (more than 50 days/year or 8 hours/week off-farm work);
- pluriactive (more than 50 days/year or 8 hours/week for both on and off-farm work);
- housewives (less than 50 days/year or 8 hours/week for both on and off-farm work).

In each study area data collected from a survey among farm women have been included, which resulted in a useful tool to analyse differences between women within and between the study areas. In most study areas, the majority of women work mainly on farm, excluding women in Nord-Trøndelag who work mainly off farm (table 5.2).

Table 5.2 Labour situation of farm women in the study areas in 1996 (in %)

	Greece (Fthiotis)	Italy (Udine)	The Netherlands (N, E, W, S)	Norway (Nord-Trøndelag
Mainly on farm	63	40	65	30
Mainly off farm	14	29	8	38
Pluriactive	11	14	11	23
Housewife	12	17	16	9
Total (N)	100 (155)	100 (150)	100 (496)	100 (424)

Source: DEMETRA farm wormen survey 1995-1996.



A Greece: Fthiotis

B Italy: Udine

C The Netherlands: Groningen, IJssek-Vecht, North Holland North, North and Central Limburg

D Norway: Nord-Trøndelag

Source: Demetra Research

Figure 5.1 Location of the study areas in Europe

However, the differences among farm women in the study areas are not always coherent with what was expected before. In Fthiotis instead of being unemployed or being a housewife, the majority of women work mainly on farm. Since most women do not get any (entitled) income for this contribution and many women would like to get work off farm, it might be argued that this labour situation is rather a result of being hidden unemployed. Also in Udine the majority of women work mainly on farm, but there are more women working off farm or a housewife. Although most women do net get any (entitled) income for their contribution on farm, they have less propensity to work off-farm. Therefore, it might be argued that this labour situation is rather based on doing unpaid work than on being unemployed.

In the Netherlands the majority of women work mainly on farm, while only a small number of women have off-farm work. More women are entitled to get an income for doing farm work, but the few number of women with off-farm work is remarkable. In Nord-Trøndelag the majority of women work mainly off farm, but there is also a reasonable number of women who work mainly on farm or who are pluriactive. Being a housewife is less evident.

From the results in the four study areas, it might be concluded that the labour situation of farm women in Fthiotis and in Nord-Trøndelag confirm the hypothesised situation, while this is less the case in the other study areas. In Fthiotis the less diversified labour market and its high dependence on agriculture contributes to the low percentage of farm women with off-farm work. In Nord-Trøndelag, where the employment opportunities are mostly in the service sectors, more women had an off-farm job. Although in Udine, there are a reasonable number of employment opportunities outside and a part of the women worked off farm, others were not interested in such a perspective and remained at home. In the sub-areas of the Netherlands even though the study area as a whole appears diversified, the lower percentage of women observed in off-farm work is partly due to the competitive structure of agriculture, which retains farm women. However, the influence of the other factors not directly related tot the labour demand, might be more important in Udine and the Netherlands.

Concerning the importance of the other factors, equal to other women, farm women with more than compulsory education and vocational training (human capital), manage to exploit the employment opportunities off farm better than women working mainly on farm. In the northern study areas, marketable skills acquired through vocational training were more important than in the southern study areas to encourage women to work off farm. This might be related to whether women opt for a position in the primary segments of the labour markets which require more professional skills or in the secondary labour markets segments which require less skills. In the southern study areas, there seem to be more jobs which do not require marketable skills. Further vocational training provided low marketable skills for women (Efstratoglou, 1998).

Household structures, in particular the presence of pre-school children, was found to have a different effect on the labour situation of women in the study areas, dependent on the available provision of paid social services (Nord-Trøndelag), the informal exchange of services by female family members (Fhtiotis and Udine) and the values on parental care (the Netherlands and Udine). In Nord-Trøndelag the demand for those services also increases the job opportunities for women. In the southern study areas, extended families

imply an exchange of services in the long run since it are women who after a few years is bound to look after the elderly family members. Therefore, the presence of young children sooner restricts older women, but when other family members are not present, also younger women are restricted by the presence of pre-school children to find work at home (on farm). Finally, even if there are services available, the majority of women in Udine and the Netherlands consider it better for pre-school children to stay at home than to attend a day care centre (Haugen 1998).

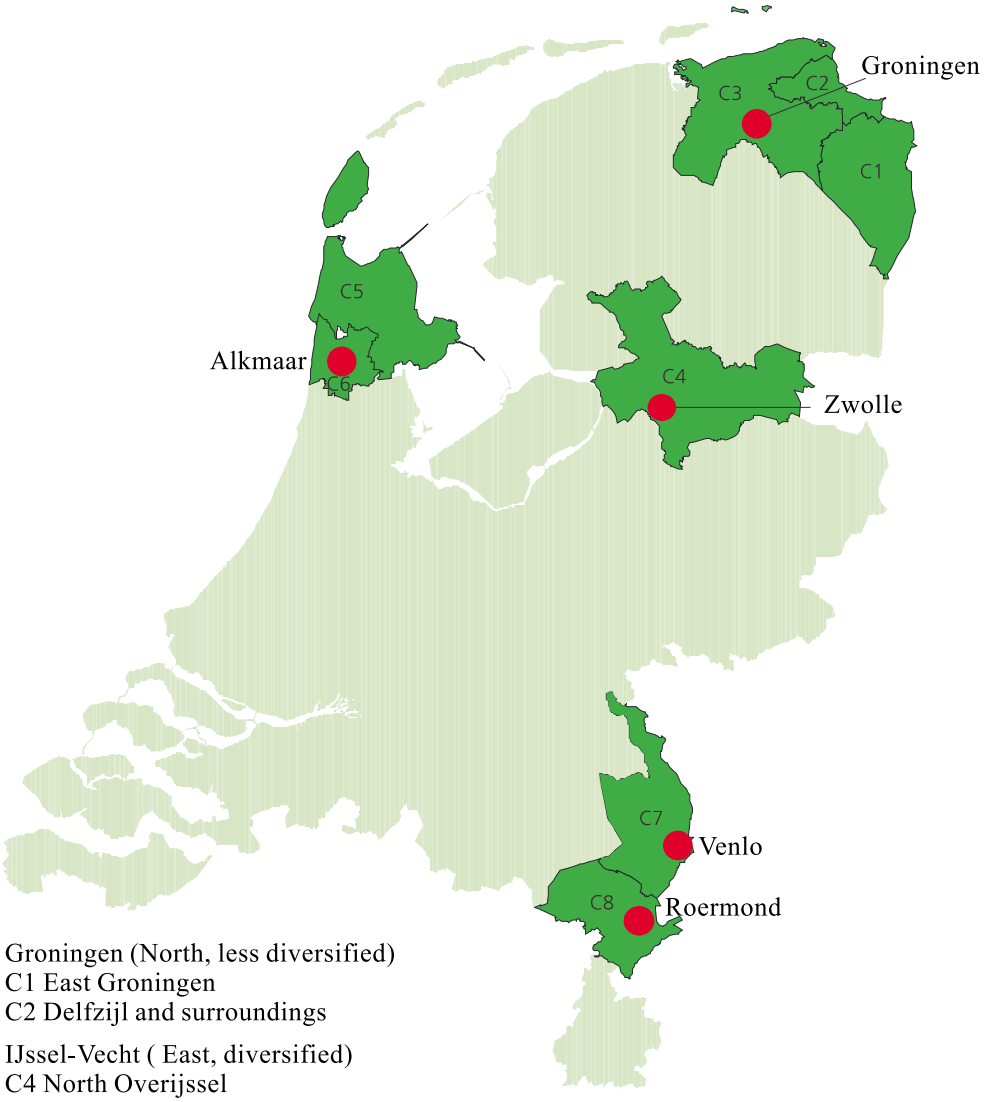
Emphasis on parental care has already shown some aspects of women's labour orientation towards on-farm and off-farm work in combination with motherhood and domestic work. Predominantly in the southern areas, women agree with the statement that a women with pre-school children should not have a job outside. More then half of the women in Nord-Trøndelag and, surprisingly only half of the women in the Netherlands who emphasised parental care, agree with this statement. The latter might be attributed to the high presence of part-time jobs in this country. Further, there is a high level of agreement among women in the southern study areas that: 'a married women should be responsible for domestic work even with a job outside', which the majority of women in the northern study areas rejected, in particular women working off farm. The respectively positive and negative ideology about feminine domesticity is consistent with the fact that in the southern study areas women spend more time to domestic work and women in the northern study areas less.

Summarising the consequence of the other factors, it might be concluded that predominantly human capital factors and women's labour orientation towards the combination of paid work and motherhood are decisive why women have a different labour situation than was hypothesised before.

5.5 Labour situation of farm women in the Netherlands

Before, the labour situation of women in the Netherlands has been explained by the average results of the four sub-areas in this country. In this section, the differences between the sub-areas will be analysed as far as they are within Dutch terms more 'rural' or 'urban' (figure 5.2).

- The 'rural' north (Groningen) fits the best with the international ideas of rurality, because many communities have a population density lower than 150 residents/km^2. The rural areas are characterised by extensive land use in arable and dairy farming. Until the first half of this century, the north was well developed with a rich agriculture. It became a peripheral region due to the concentration of employment in the western part of the country.
- The 'rural' east (IJssel-Vecht) also has communities with a population density lower than 150 residents/km^2. Typical are the wet natural areas in the north-western part. Dairy farms dominate land use in rural areas. The east had a tradition of extended families and co-operation based on the neighbourhood. It was a relatively poor region, but by degrees it has taken advantage of the exodus of employment from the western part of the country.



Groningen (North, less diversified)
C1 East Groningen
C2 Delfzijl and surroundings

IJssel-Vecht (East, diversified)
C4 North Overijssel

North Holland North (West, diversified)
C5 Head of North Holland
C6 Alkmaar and surroundings

North and Central Limburg (south, more diversified)
C7 North Limburg
C8 Central Limburg

● Cities

Figure 5.2 Location of the four sub-areas in The Netherlands

- The 'urban' west (North-Holland north) is characterised by bulbs, outdoor horticulture, arable and dairy farming. Compared with the north and east the land use in rural areas is more intensive, and the region has more varied employment like building industries and tourism. The west is a residential area, with many people commuting to Amsterdam. Although the 'urban' south (North and Central Limburg) has a high population density, due to the lack of main cities, it is often considered an area of villages. Rural employment shows a great diversity, which might reflect the enterprising and flexible spirit of the population. Most farms use little land, but are innovative due to the introduction of intensive horticulture and indoor livestock in the last quarter of this century. This region has become well developed, also because of its location between the main Dutch and German industrial ports.

If we consider the employment opportunities for women on and off farm in each sub-area, the opportunities for farm work are presented by the average number of ESU's, which measures both the size and the intensity of farms. The opportunities for off-farm work will be indicated by the activity rates of residents in each area. Using those indicators, we might hypothesise the following differences (table 5.3).

Table 5.3 Employment opportunities in the four sub-areas and the hypothesised labour situation

Employment opportunities	North Rural	East Rural	West Urban	South Urban
Average farm size and intensity in ESU	70 (Push-Pull)	55 (Push)	87 (Pull)	81 (Pull)
Regional activity rate	57% (Push)	61% (Push-Pull)	62% (Push-Pull)	64% (Pull)
Hypothesis	Unemployment (farm work)	Unemployment off-farm work)	Farm work off-farm work)	On and off-farm work

Source: Overbeek et al., 1998.

In the rural regions north and east farms are smaller and less intensive than farms in the urban regions west and south. Despite the still marginal contribution of farm-based activities to the farm income, it was less present in the rural regions and more in the urban regions. In the urban regions agriculture also contributed more to the regional employment structure (west 7% and south 9% compared to north 4% and east 6%). Further, residents in the rural regions north and east have a lower activity rate than those in the urban regions west and south. Therefore, the hypothesis is that in the rural regions fewer farm women have opportunities to find paid work on or off farm than in the urban regions.

If we consider the labour situation off farm women in terms of intensity and place of work (table 5.4), in all regions the majority of women work mainly on farm. Both in a rural and in an urban region relatively more women work on farm (east and south) or off farm (north and west). Therefore the rural-urban distinction and its hypothesised place of work does not clarify to what extent women work on or off farm, particularly not for the rural regions north and east. If we include women's entitlement to an individual income by being

registered as a co-head or head on farm or having a labour contract off farm, it has been confirmed that in the rural regions fewer farm women have opportunities to find paid work than in the urban regions.

Table 5.4 Labour situation of farm women and women with a paid status a) in the four sub-areas

	North Rural	East Rural	West Urban	South Urban	Total
1. Mainly on farm	58	69	59	71	65
2. Mainly off farm	11	7	13	5	8
3. Pluriactive	13	9	13	10	11
4. Mainly housewife	18	15	16	15	16
Total (N)	100 (113)	100 (133)	100 (120)	100 (150)	100 (496)
Paid status	45%	50%	70%	64%	58%

a) Paid status: being registered as a head or a co-head on farm or having a labour contract off farm.
Source: DEMETRA farm women's survey 1995.

Since the rural-urban distinction does not clarify to what extent women work on or off farm in the rural regions north and east, it is likely that other factors are more important to explain the labour situation of women. Therefore the main characteristics of the other relevant factors will be analysed (table 5.5). In the north, more women have an upper secondary or a tertiary education, which implies that they are more willing to find a job off farm. Hence, human capital is a relevant factor to explain why women in the north work more often off farm than was hypothesised before. The opposite situation holds for women in the east, where fewer women are well-educated and work more often on farm. In the east, besides the lack of education, also the higher presence of pre-school children and the orientation of women that those mothers cannot have a job outside, are relevant factors. The labour situation of women in the west and south was less different than was hypothesised before. For women in the west, the rejection of the statement that a woman with pre-school children should not have a job outside, might be a relevant factor why somewhat more women work off farm compared to women in the south.

Table 5.5 Factors which explain the labour situation of farm women in the four sub-areas (weighted response)

	North Rural	East Rural	West Urban	South Urban	Total
Human capital:					
more than compulsory education	55%	36%	41%	38%	42%
Household:					
pre-school children	24%	35%	27%	27%	28%
Labour orientation:					
a woman with pre-school children should not have a job outside	52%	67%	41%	53%	53%

Source: DEMETRA farm women's survey 1995.

5.6 Conclusions

The analysis of the labour situation of farm women in different rural areas in Europe provides five conclusions. Firstly, agriculture is no longer a characteristic function for rural areas, because to an increasing extent there are cultivation's more determinated by a good logistic infrastructure and technical conditions than by a natural and open space. In the urban areas those intensive cultivation's are more frequent and they provide women opportunities to get paid work on farm. As long as those cultivation's comply with environmental conditions and restrictions, it implies that agriculture also creates employment opportunities and does not only loose it.

Secondly, the trends in agriculture which provide farm women employment opportunities are not so much related to the diversification of farm activities, but sooner to the increase of labour-intensive cultivation's. In none of the study areas other farm-based activities had an important impact on the farm income.

Thirdly, in most study areas the marginalisation of agriculture implies a decrease of employment opportunities on farm. More women tend to find work outside. The realisation of this depends not only on the presence of other jobs, but also on the relevant human capital and the labour orientation of farm women towards the combination of paid work and care tasks.

Fourthly, farm women are not an isolated category of female labourers and factors relevant at the individual level are also contextual issues. For instance, the orientation of women towards the combination of paid work and care tasks also depends on how market, family and state encourage women to combine those tasks. While the high economic activity of women in Nord-Trøndelag might be attributed to the increase of paid jobs in community, social and personal services, in Udine and in the four sub-areas Netherlands the traditional catholic culture sooner discouraged women to work outside.

Fifthly, to conclude with a statement, the analysis of the labour situation of farm women in the study areas has shown that the context of 'rural' regions is quite difficult to

measure by common indicators. Therefore, it is a better strategy to explore the opportunities and constraints in the region as it has been done with the push-pull factors.

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6. Contesting Spaces and Places - Conflicting Geographic Imaginaries in the Countryside March, London, March 1, 1998

Rhys Evans

6.1 Introduction

Rural places in developed nations occupy a contradictory place in the popular imagination. On one hand, for many they are destinations of desire, reserves of naturalness, sources of recuperation from the morbidity's of metropolitan life. On the other they are also seen as reservoirs of rural deprivation, isolation and banality. Beyond binarisms, the range of meanings attached to rural places extend across a continuum from morbidity to sublimity. In northern Europe, rural places face a unique set of problems which stem from competing imaginaries cast the rural as at once both places of desire and of repulsion (Williams 1973, Urry 1995, Cloke & Little, 1997).

In addition, rural places face concrete, material problems - problems of environmental degradation, problems of excessive demand for rural amenities, of declining services and changing employment opportunities, and of changing demographics and circumstances (Marsden, Murdoch, Lowe, Munton & Flynn 1993). Attempts to 'preserve' countrysides change the very spaces to be preserved (Cloke & Thrift in Marsden, Lowe & Whatmore 1990). Many countrysides conceal rural poverty and deprivation behind a façade of wealthy ex-urban society (Cloke in Philo 1995). In particular, rural policy-makers are faced with difficult choices in an attempt to resolve conflicts between existing rural populations and a growing ex-urban presence in rural areas.

The material problems faced by rural areas are vexing enough for policy makers. However, what could be relatively simple decisions about deploying resources for infrastructure provision or about limiting the amount or type of development taking place in rural places, are, in a democratic society, complicated by the need to take in to account the beliefs, aspirations and desires of a population with deeply conflicted understandings of rural life. These beliefs about the nature and purpose of rurality both support and deny very different sets of policies about rural development and preservation and lie at the heart of problems facing an urbanising countryside in the developed world.

This paper looks at this situation by closely observing one particular fissure in rural-urban relations as expressed by the Countryside Rally (July 10, 1997) and the Countryside March (March 1, 1998) in which, respectively, 80,000 and 180,000 'rural' people marched to London to protest what they saw as an urban attack on 'country' ways of life. It does so in order to tease out the strands of belief and meanings which underlie British notions of rurality in order to illustrate both strength of such beliefs (and their concomitant impact on rural policy) and to illustrate the multiplicity of beliefs which can flourish when the meaning of a place becomes detached from its historical and material existence.

6.2 Geographic Imaginaries

All places exist as both material spaces and spaces of human aspirations and cognitions. Donald Meinig states that 'every nation has its symbolic landscapes. They are part of the iconography of nationhood, part of the shared ideas and memories and feelings which bind a people together' (1979, 164). The countryside is clearly one such symbolic landscape. As such what it means is as important as what is empirically present. The spatial and the social are not two separate entities, but are inseparably intertwined, each constituting the other (Massey and Harvey 1996, Massey 1993, Barnes 1996). Our definitions of ourselves and the sociality we are part of are affected by where we are, and in turn, affect what we do in, and to those places. In other words, our beliefs and world-views - our geographical imaginaries - of places affect what we believe does, and should happen in particular spaces.

Many writers have explored the role of the rural in British imaginaries, from Raymond Williams' explorations of the role of the pastoral in English literature and popular imagination (1973), to current commentators such as John Urry (Consuming Places, 1995), who focuses directly upon the exploitation of the countryside as a space of consumption and recreation [1]. And yet such popular imaginaries continue to exert as much social force as they ever have. How do these geographical imaginaries function and how do they exert such force upon the way we see and interact with particular landscapes? In order to understand one specific example of this, I will look at the English Countryside.

A: Discursive formations

The myriad meanings, aspirations and emotions which constitute the produced entity called the English Countryside can be called a discursive formation. A discursive formation is a constellation of meanings which emerge out of collective representations-representations performed in the inhabited life-spaces of communities, communities local and extra-local to the discursive formation. A discourse is a set of meanings out of which discursive formation is constituted. From the study semiotics, the term points to meanings formed or signified by a sign or symbol. The relationship between a sign, and what is signified is socially constructed and can have little, or indeed nothing to do with the content of the material sign. Indeed the primary meanings of a sign vary by discourse.

Discourses are open-ended linguistic structures constructed out of speech-acts, the practices of signification, not just words, but acts themselves, and provide a framework for understanding the world. They are not only how we communicate, but also:

> 'Are both enabling as well as constraining: they determine answers to questions, as well as the questions that can be asked. More generally, a discourse constitutes the limits within which ideas and practices are considered to be natural; that is, they set the bounds on what questions are considered relevant or even intelligible.' (Barnes & Duncan, 1992, 8)

1 See also, Bunce 1994; Harrison 1982; Newby 1979, 1988; Marsden Lowe & Whatmore 1990; Halfacree in Cloke & Little 1997; Cloke, Doel, Matless, Philips and Thrift 1994.

Discourses consist of ways of speaking (or writing or other systems of representation) which are framed by the limits of meanings of the terms used. Thus words have different meaning according to the discourse within which they appear. Wealth, for example, conveys a different set of meanings, consequences and actions whether used within an American discourse of capitalism or the capitalism of mid-nineteenth century British Protestant capitalism.

Discourses formations are iterated, and the iteration is an important a factor in the encompassed meanings as well as historical prepositions. The iteration can be a speech act (mediated or live), a physical act, or even the absence of an act, but discursive meanings come from communication within a social milieu. Each time a formation is iterated, its particular constellation of meanings is constructed a new, and so discursive formations are always in flux even though partially constituted from existing shared historical meanings. Indeed, when derived from differing discourses, the same discursive formations can have very different connotations. This is how the same signifier can be used to represent two very different sets of qualities and this lies at the root of conflict over the meanings of a sign like the Countryside.

Discourses are one means by which social factors produce social life. To Anthony Giddens (Giddens 1984, Cohen 1989, 47), they are the stuff of social action. To Giddens, social structures do not exist as independent entities but are iterated through the praxis of social actors. Meaning, distinction and power are not objects or platonic forms, but rather are processes, only extant when being expressed, whether consciously or not. Discursive formations are the constellations of meanings - meanings of existence, entitlement, relationship and power which are constituted out of acts of representation, iteration and interaction. With the act of production, or reproduction, the discursive formations appear to have an existence of their own - they seem to influence, affect and alter other things. They have this apparent concrete-ness because they mask the naturalising power of discourses. Formations become associated with particular social institutions and the meanings become associated with the formation. Thus some discourses of English national and regional identities are associated with the countryside. People in powerful groups can appropriate a sign as a symbol of their identities, and this naturalises their personal entitlement to the qualities associated the symbol. I shall explore this naturalisation and the entitlement further when looking at who claims a voice in the debates about the countryside.

The appropriation of discursive formations by groups in society completes the process of emptying-out the original content of a sign, detaching the sign from its original meanings, and naturalising the relationship between the signifier and its new social content. The empty sign then acquires what Roland Barthes calls a 'second-order meaning' (1986, 122). This is Barthes' definition of 'myth'. When the signifier is a real material object – in this case a landscape - the history, and the materiality of the object are distorted by the emptying-out process of appropriation. Thus an object becomes alienated from its histories, 'real' and constructed. The process of alienation is central to the process of creating these second order meanings and to study the process of that alienation and investiture is to study the power relations around the object, power relations sometimes sited far from the actual object.

In this case, the signs we are interested in are those of the English Countryside. What is signified are the diverse meanings presented by influential representations of rural England, whether literary, cinematic, political or other. Although the exact composition of meanings in the discursive formation called English Countryside vary from individual to individual, and across time, there is nevertheless a core of shared meanings. Thus when we encounter the sign 'English Countryside' we think we know what it means, and to an extent we do share common meanings which we generally will agree upon, or at least recognise, even as we contest them.

B: Space-myths

Rob Shields uses another term, space-myths, to describe this phenomenon. His space-myths are an example of the process of alienation and investiture. Space-myths are 'spatial beliefs, theories, and practices within the matrix of culture' (1991, 162). These symbolic landscapes come to represent much more than just the territory they occupy. Discussing one such symbolic landscape – the Canadian North - Shields asserts that they have 'been appropriated as one symbol of specific Canadian nationalistic discourse..' (162). In a like manner, the English Countryside has also been appropriated as a symbol of Englishness.

Shields discusses the discursive formation of the Canadian North in his Places on the Margin (1991). He could be talking about the English Countryside when saying,

> 'The ideological "True North" is an empty page onto which can be projected images of the essence of 'Canadian-ness' and also images to define one's urban existence against… The North is less a real region signified by a name and more a name, a signifier, with a historically-variable, socially-defined content.' (165)

Looking at the welter of representations of the countryside and the way in which the countryside is implicated in political ideologies and personal narratives and myths, it too operates as a blank slate upon which can be projected images of the essence of 'Englishness'.

This is not to say that neither the Canadian North nor the English Countryside exist as places, places which can be subjected to empirical examination. Indeed, in the case of the English countryside, to do just such a thing will be a necessary part of this study, if only to indicate how discourses of rurality have become detached from the actualities of what is present on the ground. However, those localities, those places, are as much socially constructed as they are physically constructed. Yet the two are related and it is that relation - between beliefs and imaginings about the countryside (constructed out of representations, ideologies and place-myths) and political relations about identity, land-use and conflict which is central to my argument.

In other words, to quote Cosgrove and Daniels (1988), 'A landscape is a cultural image, a pictorial way of representing, structuring or symbolising surroundings' (1). Again, landscapes are also, of course, material artefacts. Nevertheless, if we regard a landscape as something which is constructed by human inter-action; interaction between humans, and between humans and the physical environment, then it is inescapable that landscapes are more than isolated material processes - the shapes they become; what occurs within them;

the human and non-human lives within them are strongly constituted out of human beliefs and endeavours. Thus, the presence or absence of material features within a physical landscape are signs of a contested economic, political and cultural terrain. A landscape is, therefore, amongst other things, a representation of human ideology, action and power. It is in this sense that we can call a landscape a discursive formation.

To recap then, just as there are multiple ways to quantitatively define rurality, there are multiple sets of symbolic meanings of it. The 'myth' of the rural idyll; the 'rural ideal'; and the symbolic landscape of rural England are constructed out of social relations expressed as history, representation and actions. The sign of 'countryside' has come to be alienated from its material origins and has been appropriated by a number of different social institutions an actors, and invested with sentiments and meanings far removed from the land itself. Nostalgia for an innocent childhood and a state of Edenic grace, depicted by children's literature; appropriation by an ascendant Victorian bourgeoisie; investment with rhetoric's of national identity; these are examples of specific socialisation's which have been factors in the creation of the myth of the rural idyll and the place-myth of the countryside. I now will examine some of the specific sets of meanings which constitute the contested terrain of the British countryside in the 1990s in order to identify some of the fault-lines over which these differing geographic imaginaries are opposed.

6.3 The urbanising countryside in England

Through time and social action the English countryside has become to represent many things. Historically, it has been located at the heart of English nationalism (Williams, Bunce), and as the source of all that is good and moral about Britain [1]. At the same time, the landed aristocracy symbolised the heart of the English caste system, their country seats being the heartland's of reactionary resistance to democracy, justice and change. Country yokels became symbols of backwardness and febrility at the same time as representing the positive qualities of hard workingness, plain speech and honesty [2].

Over time there has emerged a set of meanings of the city and the country which have set them up as binary opposites, and this duality still obtains in modern-day England. In this schema, the city, whilst vital, is degenerate, addicted to fashion, a sink of vice, a destroyer of health and a corrupter of morals; it makes men effete and women adulterous. The countryside, by contrast, is a land in communion with nature. It is place of health, beauty and, in contrast to the city, unchanging (Williams, Bunce).

It is this particular constellation of meanings which underpin the protest of the Countryside Rally and Countryside March. In addition, the opposition of the urban and the rural is mirrored by two different ways of understanding rural land. To rural landowners, farmers, and workers, the rural landscape is a landscape of production - a place to produce wealth from the commodities produced on the land, whether crops, cattle, or timber. This orientation towards production means that even when commodity production becomes impossible, the land becomes the ultimate commodity and can be developed for wealth

[1] Witness John Major's countryside of 'warm beer and the sound of cricket bats'.
[2] For example, consider the gardener in Lady Chatterly's Lover by D.H. Lawrence.

through commercial or residential development. Amenity values such as beauty or a 'natural' environment take a second place to the realities of producing a living off the land.

From an urban perspective, the rural landscape is primarily perceived and valued for its amenities. Amenities such as beauty, cleanness, 'naturalness'. Its value lies in the consumption of these amenities themselves for recreation or as a resource for residential choice. Thus, productive activities which interfere with amenity consumption degrade the value of the rural landscape and therefore must be regulated to assure that the important amenity values remain sustained.

To put it another way, one group sees the land as a space of production and another as a space of consumption. This is not just an academic distinction. A quote from the reportage of the Countryside will indicate the depth of feeling and understanding these discursive formations engender.

> 'For the other side (ruralists) the city is degenerate, addicted to fashion, a sink of vice, a destroyer of health and a corrupter of morals; it makes men effete and women adulterous… The countryside, by contrast, is a land in communion with nature. It alone has a landscape. Those fields and villages reserve the traditions and the heritage of the nation. It is healthy and its colour is ruddy - the hue of roast beef and of the independence of old England. Children may roam it in peace, naming flowers and climbing trees.' (David Aaronovitch. 'Arcadia comes to the Big Smoke, to tell its wellworn tale of woe.' The Independent, Feb 27 1998 pp. 21.)

It is this dichotomy, which now affects the urbanising countryside in England. As the numbers of ex-urban migrants to the countryside grows and the number of rural people employed in productive activities such as agriculture declines due to increasing efficiency and declining quantities of land in production, a conflict has arisen between those who value the land for its productive potential and those who value it for its amenities. Increasingly, ex-urban middle-class incomers are beginning to mount campaigns and join local governments and heritage planning boards in order to make sure that the countryside confirms to their geographic imaginaries of what the rural idyll should be. This class-fraction tends to be of a high socio-economic status, university educated, media-literate and experienced at raising its voice in urban and national politics. In contrast with working rural people, these newcomers not only know how to get their voices heard, but they also have an expectation that if they speak up, they will be heard. This has brought about numerous clashes over land-use issues such as quarry expansion, new housing development, roads building and land development for shopping malls, etc. On the one hand, such developments bring needed wealth and jobs into the local environment, on the other, they pose a physical blight upon the aesthetics of naturalness which attracted the newcomers in the first place. Thus, repeated all over England, the countryside has become the site of conflict between those who see the land as a resource for production and those who see it as a set of amenities to be consumed.

6.4 The Countryside Rally and the Countryside March

On March 1st, 1998, somewhere between 150,000 and a quarter of a million demonstrators marched through central London as part of what was called the Countryside March. This event marked a high point of rural protest against changing conditions in the countryside and apparently featured a coming-together for mutual protection and protest, of a coalition of rural actors from agricultural workers to landed aristocracy. It was not an isolated event, however, being preceded by the Countryside Rally on July 10, 1997, which featured 80,000 marchers into London, and a numerous protests by the National Farmer's Union and other farming lobby groups over the importation of foreign beef supplies which undercut the production prices of British beef.

The Countryside March marked a significant move by rural interests onto the public stage and was aimed to put pressure (quite successfully) on the New Labour government. It's ostensible purpose was to pressure the government to reconsider some of its rural policies, such as the siting of half of 4,5 million new homes on Greenfield rural sites, the turn towards free markets and declining subsidies in agriculture, the shrinkage of rural service provision and, most importantly, a ban on fox and stag hunting with hounds.

While there is no doubt that the Countryside March represented a significant flexing of rural muscle on the national political agenda, a detailed and thorough analysis of the genesis, organisation, articulation and representation of rural interests in the March will reveal that within, as well as outside of the countryside movement, there is a chaotic plethora of interests, positions and imaginaries about the countryside which were expressed through this protest, with the result that it achieved far less than it wanted to, and indeed, far less than was apparent immediately after the March.

A: Origins of the Countryside March

The March was orchestrated by the Countryside Alliance (CA), a lobbying group which emerged out of the pro-hunting lobbies which grew in response to the increasing levels of protest and regulation of hunting in the 1980s and 1990s. A brief exploration of the origins of the CA will illustrate the pro-hunting origins of the group.

The Countryside Alliance was formed in 1997 from a merger of the British Field Sports Society (BFSS), the Countryside Business Group (CBP) and the Countryside Movement (CA website, 1998).

The British Field Sports Society, the 69-year old voice of hunting, shooting and fishing in Britain has 80,000 members and 781 affiliated groups. It enjoys wealthy and influential support from country landowners, gun manufacturers and the sports goods industry. Dr. Charles Goodson-Wickes, the chairman of the Countryside Alliance, and a Tory MP until the last election, is also chairman of the BFSS (Becket 1998).

The Countryside Business Group was formed by Eric Bettelheim (ironically, a Chicago-born lawyer and Vietnam War protest organiser) in response to a 1992 speech by Enoch Powell suggesting that field sports were a civil liberty which was rapidly coming under threat. Bettelheim set up the CBG to influence policy in favour of field sports, creating a well-funded modern political lobbying operation. He signed up 10 founding members of the group, each prepared to pay up to £10,000. Supporters of the CBG include

Lord Steel of Aikwood, chairman of the Countryside Movement; the Duke of Westminster, Britain's richest man and underwriter of the Countryside Movement; Sir Alick Rankin, chairman of General Accident and director designate of the new Countryside Alliance; and Jonny Weatherby, chairman of the family firm which runs British racing.

The Countryside Movement, launched in 1995 with a $400,000 dollar grant from the BFSS was backed by wealthy landowners, including Britain's richest landlord, the Duke of Westminster, blood sports groups and gun importer. Again, its purpose was to lobby on behalf of rural pursuits, particularly hunting.

The Countryside Alliance, formed in March 1997, is an amalgamation of the Countryside Movement, the Countryside Business Group and the British Field Sports Society. (Woods 1998, Burrell 1998, Beckett 1998, n.a. The Observer March 1, 1998).

The initial Countryside Rally came about in response to the election of the New Labour government in 1997. It was expected that New Labour would produce an anti-hunting bill and the BFSS decided to pre-empt this by organising a mass pro-hunting demonstration on July 10 of that year - the first date which a Private Member's Bill on the issue could be tendered. However, experience from a rally organised by the Sportsmen's Association against gun control (which only attracted 20,000 demonstrators) indicated that broad public support could not be mounted around hunting alone. Thus the decision was taken to call the July 10 protest the 'Countryside Rally' and to cast it as in defence of the countryside, not of hunting per se. (Woods, Burrell). In the event, the Rally was deemed a success as it attracted approximately 80,000 people to a rally in London's Hyde Park where they listened to speeches from politicians, writers, actors and representatives of field sports organisations.

However, a Private Member's Bill was introduced by the Labour MP Michael Foster to ban hunting with hounds later that year. An open vote was called for and polls indicated that the majority of the House of Commons would support the Bill. Indeed, the Prime Minister said that he would personally support such a Bill. In response, another protest was planned for March 1st, 1998. This was the Countryside March.

B: Conflicting stories and conflicting imaginaries

As seen above, the Countryside Alliance grew out of the concerns of supporters of hunting - financed by wealthy businessmen and peers and supported by working country people who benefited from the hunts. Yet, they constructed the debate about hunting as an urban-rural conflict. In doing so, they managed to align concerns about hunting with other concerns about rural problems (Woods). The official position was that the threat to hunting was a threat to the 'rural way of life', positioning it along side rural deprivation and unemployment, the transformation of rural villages by wealthy newcomers and the decline in the fortunes of the family farm. Indeed, the Countryside Alliance's mission statement regarding the March stated that 'This initiative arose as a response to the frustration and concern felt by country people against the threats posed to the countryside and their jobs, by politicians and urban influence' (Porter 1997 02). The Alliance's Web site states 'The Countryside Alliance brought the Countryside March to London on 1st March 1998. to voice their concern for the future of the countryside… (and) have reinforced our duty to fight for the interests and wishes of rural people' (Countryside Alliance). It goes on to

identify eight issues which claims lies at the heart of its campaign: 'Countryside access, agriculture, rural employment, rural services, rural small business, housing and development, conservation, and animal welfare' (CA). No where does this Web page mention the right to hunt. Rather, the concerns expressed are those of rural people in general, in opposition to urban influence, the kind of morbid influences detailed in the earlier section of this paper which are believed attached to urban life.

That the CA's interests remain firmly rooted in promoting hunting can be seen by another page on their Web site, however. In a list of recent news - a compendium primarily of CA press releases with a few news articles it wishes readers to see, there are 74 releases dated between January 10, 1998 and November 4, 1998. Of these, 43 are directly about the campaign to assure the right to hunt. Additionally, its 'Archive News' pages features 11 of 13 press releases which are about the pro-hunting campaign.

By framing its pro-blood sports message within wider imaginaries of a productive countryside under threat, the CA was able to mobilise such a large turnout for the Countryside March on March 1st. However, as Janet George, former press spokesperson of the CA, since resigned, states: 'You can unite different interests for a march or a rally, but when you do it in an organisation it creates problems. A membership organisation can't represent conflicting views. And rural Britain is not one big happy family. The great and the good in the Countryside Alliance say they're concerned about rural schools. Their kids go to Eton.' (Beckett, August 13, 1998).

Indeed, after the March, the issue faded from the public stage quite quickly. The Private Member's Bill failed due to an executive government decision not to give it time for reading in the House. And press reports of the CA, and rural problems reverted to the usual desultory level.

A major factor in this are the conflicting imaginaries of the countryside which formed the uncomfortable alliance which produced the Countryside March. Rural society is not homogenous, even if one of the geographic imaginaries of rural society is that it is. As John Urry states: 'Studies of rural communities have shown that there may be considerable conflict and opposition in such places, especially around status, access to land and housing and the nature of the 'environment'. In Britain many rural areas have become increasingly populated not by those employed in farming but by urban newcomers who pushed out existing poorly paid farm labourers or their children (1995, 10). So, within existing communities, within communities of newcomers, and within the geographic imaginaries of urban communities, there remains much conflict over what the rural is, what it should be, whether it should be preserved and if so, how it should be preserved.

C: Representation of the Countryside March

The differing geographic imaginaries can be seen in the press coverage of the Countryside March (and Rally). Normally the English press gives a fairly homogenous view of events, given the overt political aspirations of the individual newspapers. Whatever the political interpretation, the basic stories are usually very similar whether reported by the right-wing Telegraph and Times or left-wing Independent and Guardian. However, such is the nature of conflicting imaginaries that the papers were not able to produce a coherent account of the Countryside March. To one paper it was the product of rich businessmen and

aristocrats, in another, of ordinary working country people. In one, the issues were about rural loss and deprivation, in others it was about the right to elites to maintain their elitism. To one the political issues were about the right to barbarically kill foxes, to another about the rights of a minority to resist a fascistic dictatorship of the democratic majority. As the following section will indicate, just like the rural countryside itself, there seems as many interpretations, imaginaries and sets of meanings as there are people with interests in the rural environment.

D: The headlines

The headlines alone are a good indicator of the contradictory positions in the papers. The following is from a small selection of reports covering the Countryside March, paired around the issues (and imaginaries) reported.

Hunting is our art, our life, we'll fight for those things with all our strength	- The Daily Telegraph, July 11, 1997
Aggrieved, unpleasant land	- The Observer, Feb 22, 1998
Living in the country doesn't mean I like hunters or hunting	- The Independent, March 1, 1998.
Faithful gather in countryside blood feud	- Guardian, July 11, p5.
Everyone's going to town on their own hobbyhorse - they won't be marching to the same tune	- The Observer, March 1, 1998, p8-9.
Hunt for sanity in countryside debate	- The Guardian, July 11, p19.
Labour puts on the Barbour and wellies	- The Sunday Telegraph, March 1, 1998.
The Barbourians are at the gate	- The Independent, March 1, 1998.
The country comes to town	- The Daily Telegraph, July 1, 1998.
Country fights for tradition	- The Guardian, July 11, 1997, p1.
The issues: 'grand coalition' conceals fight against hunt ban	- The Guardian, March 2, 1998.
The day the city became a shire	- The Guardian, March 2, 1998.
When the country was set alight	- The Independent, Feb. 28, 1998.
Countryside march 'half claimed size'	- The Independent, March 4, 1998.
Tories at the head of march	- The Guardian, March 2, 1998.
Hague denies Tories are hijacking rally	- The Sunday Telegraph, March 1, 1998.
Rural rally marchers '80pc Tory voters'	- The Guardian, March 3, 1998.
Labour bows to country people power	- The Times, March 2, 1998.
Squires and grooms join the ranks	- The Times, March 2, 1998.
The journey: A few were given tickets because their pay is so low	- The Guardian, March 2, 1998.
Arcadia comes to the Big Smoke to tell its well-worn tale of woe	- The Independent, Feb. 27, 1998.
Countryside under the siege cries for help	- The Sunday Telegraph, March 1, 1998.
Rural lobby rides high	- The Guardian, March 2, 1998.
Rural march hijacked by 'dark forces'	- The Independent, Feb. 27, 1998.
Listen to them: the defence of individual liberty gives this march its integrity	- The Sunday Telegraph, March 1, 1998.

From the headlines, and the subsequent copy in the articles, the various ways of viewing the countryside can be reduced to a few major oppositions. The first is over whether the March represents the desires of all rural residents or just a particular elite. For example, John Vidal reports:

'Why are we marching? Why, to tell those people who haven't a clue about the countryside that they can't just walk over us. This is much more than hunting, 'says David Jones of Llanidloes, who has walked all the way (to London). 'Cities, these days, think we don't exist'. The hunting thing is just a part of the problem. We're treated like nothing. They've closed our hospitals, cut back on our services, everything is more expensive for us. The countryside is becoming a sink for the poor. They are pushing us further and further.' (Vidal, July 5, 1997, pp. 3)

On the other hand, Henry Porter reports in the Guardian,

'The mission statement of the countryside marches that converge on Hyde Park in London today reads as follows: "This initiative arose as a response to the frustration and concerns belt by country people against the threats posed to the countryside, and their jobs, by politicians and urban influence, through prejudice, ignorance, and diminishing rural representation."'

'Nowhere is hunting mentioned, which seems at the very least to be an oversight and, at the very most, ludicrously optimistic spin. Hunting is the primary issue and behind it, rather than in front, come all the resentments of the countryside - the cancelled bus services, the merged schools, the closure of cottage hospitals, the plans for large-scale housing development and the endless demands of the ramblers, mountain bikers.' (Porter, July 10, 1998, G2 section, p 2)

Further, the Observer reported that,

'Today the gentry, their employees and tenants - some provided with free tickets for London - will protest against a government accused of threatening the countryside. The irony is not lost on some in counties such as Northumberland where the landscape is sometimes threatened by landowners themselves.' (The Observer, March 1, 1998, p 8)

These are reports from the same newspaper (with the Observer operated by the same trust as the Guardian) so one would expect a similar political orientation, if not exactly standardised reportage. Yet one claims that it is the common people who are the source of this protest, the other, the hunters, another wealthy gentry.

Likewise, a leader in the Independent stated that,

'The credibility of today's Countryside Alliance demonstration has already been badly undermined. It has been conspicuously unsuccessful so far in presenting a consortium driven by land-owners, farmers and big businessmen - pushed and prodded by bizarre allies such as the Ministry of Defence and gun lobbyists from the United States - as a spontaneous uprising of workers and peasants. If a Labour government fails to confront the landed and capitalist interests that wish to prevent walkers from rambling freely in designated and uncultivated country, then no one will.' (The Independent on Sunday, March 1, 1998, p 21)

Whereas the Sunday Telegraph's leader claimed that,

> 'Today's Countryside March brings to London not the massed forces of an aggrieved vested interest, but a richly diverse range of Britons united in their desire to preserve the rural way of life. Huntsman is marching alongside environmentalist, land-owner alongside rambler, New Age radical alongside tweedy patrician…Such contradictions should not be discounted. But neither should they obscure the genuine integrity of purpose and moral coherence which underpin today's historic event.' (March 1, 1998, p 30)

Was it a clique of wealthy and reactionary, and American interests fighting a loss of power over the imaginaries (and their consequences) in the countryside, or a richly diverse of Britons?

Another report claimed that,

> 'There was little evidence of the Home Counties posing kit of green wellies and shiny new Barbours which townies affect north of Potter's Bar. The very occasional black Labrador looked as though it worked for its living.' (Hamilton, The Times. March 2, 1998, p 1)

Whilst another reported,

> 'It took five hours for all of the marchers to set off. Most were genteelly dressed, in Barbour jackets or green tweeds, and many carried pro-hunting banners. Julia Long, an animal rights activist who turned up to picket the event complained that the march had been 'taken over' by the pro-hunting lobby. 'I don't know if there are any genuinely hard-up people there at all. They all look pretty prosperous to me.' (Harding, The Guardian, March 2, 1998, p 4)

Did the reporters see what they wanted to see? Presumably they were covering the same event. And surely it is not simple the differing political orientation of the newspapers which led them to tell such different stories. Whilst it is possible that they were are different parts of the march and generalised from different samples of the total population of marchers, that level of inaccuracy is not typical of British broadsheet journalism. It certainly does seem that differing imaginaries of the countryside, of who has a legitimate voice in the countryside and of who this protest represents are present in these two accounts which purport to tell the same story.

Another way in which the protest was framed was to link it with a long British history of democratic revolt and nationalistic protest sited in the countryside. Yet the reports on this democratic principle were equally contradictory.

'The Countryside Alliance does not speak for the majority of people in the countryside. In fact a recent MORI poll showed that 57 per cent of people living in rural areas support the Foster Bill.' (Wendy Leavesley, The Independent, n.d.)

The Guardian reported,

'A tweedy lady was telling her friend: 'This is meant to be a bloody democracy. But you can't do anything these days.' Next to her was one of the antis, trying to explain his case: 'This is a democratic country and most people don't want fox hunting.' (Matthew Engel, The Guardian, March 2, 1998, p 1)

Indeed, some marchers claimed that country people were subject to a dictatorship of a democratic majority and cast themselves and their issues as a minority, discriminated against by an urban majority.

'Lady Mallalieu, a keen huntswoman said that the rally was about 'the freedom of people to choose how they live their own lives. It is about tolerance of minorities and, sadly those who live in the countryside are now a minority. It is about listening to and respecting the views of other people of which you may personally disapprove. Frederick Forsyth directed his brief speech to Tony Blair… 'You can run this country the way you promised or you can run it as an elective dictatorship. We are waiting for your answer.' (Charles Clover, The Daily Telegraph, July 11, 1998, p 4)

The same speaker went on to defend the pro-hunting lobby saying,

'Hunting is our music, it is our poetry, it is our art, it is our pleasure. It is where many of our best friendships are made, it is our community. It is our whole way of life… Lady Mallalieu ended her highly charged speech with the words Shakespeare gave to Henry V, addressing another minority 'We few, we happy few, we band of brothers on the eve of another battle, Agincourt.' (Charles Clover, The Daily Telegraph, July 11, 1998, p 4)

On the one hand, the protesters were seen as defenders of democracy, on the other, the interests of the countryside were reported to be the interests of a small elite of wealthy landowners and landed gentry. They have always been a minority, but their power has been disproportionate to their size. Indeed, while a great emphasis was put by the organisers upon a peaceful and civilised demonstration, some reporters cast the rural protesters in a different light:

'Stephan Rothwell, a barrister who moved with his wife Sarah to the area (Peak District) 15 years ago, could be on a different march. He wants Piccadilly to echo to the cry 'Listen to us'. He predicts civil disobedience if the government does not. 'If they proceed with this (ban of hunting) I think there are at least 10,000 or 20,000 people who are prepared to go to prison sighting against it,' he says. He speculates

> that blocking motorways with horseboxes might be a tactic in the next stage of the rural rising.' (Steve Boggan, The Independent on Sunday, March 1, 1998, p 3)

Much less gracefully, the rural working people were portrayed by one commentator as hardly passive or respectful,

> 'They intend that this great rural rebellion should be orderly and non-violent. Yet rumbling through their ranks will be a powerful conviction that they are victims of a class war that has turned the countryside into a battle zone in which remnants of a proletarian 'us' rage against remnants of a privileged 'them': animals rightists v field sports, ramblers v landowners, the green uplands v council estates.'
>
> 'The loudest cheers were for veiled threats rather than calls for conciliation. 'This is the last peaceful march and this is the last peaceful rally,' boomed David Jones, a professional huntsman, to wild applause and a few nervous looks from the organisers.'

and,

> 'I'm pigsick of weirds with beards of both sexes assaulting me, 'cried the Daily Telegraph's country writer, R W F Poole, to some of the loudest cheers. 'From now on, I will return blows and abuse with compound interest. Stop letting these townie buggers grind us down!' (Robert Hardman, The Daily Telegraph, July 11, 1997, p 1)

Again, we have conflicting portrayals of rural people. The rural elite are on one hand, civilised and effete, on the other, dangerous and violent. The rural working class are characterised on one hand as 'forelock tugging yokels' (Germaine Greer, The Observer, March 1, 1998, p 25), and on the other, they are dangerous, violent and capable of uncontrollable viciousness.

6.5 Conclusion

Evidence indicates that both the Countryside Rally and the Countryside March were organised in opposition to the anti-hunting stance of the New Labour government. And yet, given the numbers estimated to participate in the hunts in Britain both economically and as hunters (60,000 - 160,000 - The Guardian, July 11, 1997), it is clear that the participants in the March were composed of more than the hunting communities alone. This indicates that the organisers were successful in framing their protest as a rural verses urban issue, enrolling a larger and more general level of rural dissatisfaction amongst rural residents who may not have supported hunting and capitalising on a larger dissatisfaction over an urbanising countryside.

This became, therefore, a conflict between geographical imaginaries about the English countryside. Rather than simply a pro- and anti-hunt demonstration, the Countryside March became a vehicle for the expression of conflict over definitions of what

the countryside is, of who is rural and who is not, of what is acceptable activity in the countryside and what is not. In other words, it was a conflict between two specific geographic imaginaries – one which sees the countryside as a space of production, and one which sees it as a space of consumption.

Hunting with hounds is a specifically British phenomenon, yet the strategy of allying a single issue with those of a larger community is one which could be employed a number of specific campaigns in a number of national communities.

This conflict lies at the heart of a problem facing rural policy-makers in an urbanising countryside. Although researchers and commentators have identified that the dichotomy of rural and urban is both inaccurate and unhelpful, this division remains extremely cogent in the imaginations of the general public, whether that public is located in the countryside or in the cities. To quote Howard Newby, 'As we know, in this country especially, 'rural society' and 'urban society' are becoming increasingly interpenetrated and there is not a great deal one can do to distinguish between them in many areas' (Newby, 1990). Nevertheless, the Place Myth of the rural idyll has come to dominate urban perceptions of the countryside to such an extent that people believe the countryside is clean, healthy, beautiful and unchanging, regardless of evidence to the contrary. Likewise, rural productive communities are holding fast to the vision of a countryside in which landownership and exploitation remain the primary qualities of rural spaces. This can only lead to further conflict as these imaginaries begin to have material consequences in the built environment of the countrysides.

Rural policy-makers must understand this phenomenon if unintended negative consequences of rural policies are to be minimised. Rural working populations cannot be expected to make an instant and easy transition from productive labour to service-sector employment when their beliefs and aspirations for their homes are caught in geographic imaginaries which prioritise production over consumption.

Increasing urbanisation through in-migration of urban populations and the increasing hegemony of urban elites in national policy-making has combined with a declining willingness to subsidise rural production (and concomitant decline in typically rural employment) to erode the potency of an imaginaries of a productive countryside where the farmer or forester is predominant. Rural working populations are therefore increasingly under threat and, due to the strength of their specific geographic imaginaries, may not be able to respond to changing rural conditions in ways that urban-centred policy-makers might expect.

Thus there are very real and material consequences to such abstract phenomena as geographic imaginaries and any attempts to produce rural policy must address not only the material conditions in the countryside, but also the ideational universe which lie behind them.

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7. Plurality and Rurality: a UK perspective

Bill Slee

Abstract

Rural areas have long had diverse functions, including primary production and amenity provision. A brief examination of the historic record in the UK yields abundant evidence of both production and consumption functions of rural land over a long period of time. Attempts to explain processes and patterns of change can be grouped into people-based approaches and land use-based approaches. Examples of both are briefly examined. A Scottish example of a community which might be considered to form part of the urbanised countryside is described. The paper concludes that any satisfactory explanation of the patterns and processes of change in the urbanised countryside must recognise the interaction between economic and regulatory forces.

7.1 Introduction

As we observe the mish-mash of rural land use around the ill-defined edge of a typical British city in the late 20th century, extending as much as 50 kilometres from its centre, it is to be doubted whether this would be seen by most people, academic or lay, as a triumph of human creativity and endeavour. If the definition of land use was sharper and the lines between different uses were more tightly drawn, as in the Netherlands, there would still be a high probability that the land allocation outcome would not be viewed as a triumph. Further, it would be difficult to explain away all the 'failure' as millenarian fatalism and cynicism. Behind the general public dissatisfaction, and general (though not complete) academic neglect, there is a desire to come terms with the places we have created and transformed in the 20th century to a degree probably unparalleled in our history. In so doing, we need to look at different disciplines and understand the thinking and theorising that has informed these processes and patterns of change.

There is often a tendency to see a particular importance in the changes through which we live, which is in the longer run, is put into a different perspective. Equally, there can be little doubt that the collection of changes in rural areas, especially those close to towns and cities in late 20th century mature industrial economies described by the umbrella term 'rural restructuring' will leave at least a small mark on the longer historical record of rural transformations.

In this paper, I will endeavour to put the changes in peri-urban rural areas in the late 20th century in a longer historical perspective, explore briefly some of the theoretical constructs that might be used to explore change in the urbanised countryside, examine the nature of changes that have taken place in the community in which I live and, finally, attempt to pull together the various strands of thought in a conclusion.

7.2 A brief historical perspective

The assumption that, with the passage of time, rural areas in developed countries, especially those areas near towns and cities, have passed from the singularity of agriculture to the plurality of late 20th century confused and often multiple land use, is a grossly misleading starting point for an analysis of the competing demands for space and/or of the failure of policy in adequately resolving these demands. From the early medieval period when hunting chases were set aside for aristocratic leisure, to 16th century England, when those who had made money in trade moved into rural properties in pursuit of amenity, to the 19th century when large tracts of Scottish land were transformed by industrial and mercantile capitalists into highland sporting estates, there is evidence of tension and conflict in land use change between production and consumption uses. This recognition that 'nearly everyone who can afford to do so sets up as a country gentleman, or at least makes some effort in that direction' (Orwell 1947), indicates that the British predilection for seeking out rural living, based on urban wealth, is deep rooted.

Conflicts between rural land uses or conflicts between different claimants on rural land are also an enduring feature of the last millennium. Sometimes the conflicts have arisen between different types of farmer, such as in the extension of sheep farming into predominantly arable areas of 16th century Norfolk; sometimes the conflicts have related to the struggle of one group for subsistence and another more affluent group for leisure as in 19th century Scotland; sometimes the struggle has been between working class townspeople seeking leisure and the more aristocratic demands of sporting shooting; and finally there have been times when a predominantly urban set of interests have sought to protect their vision of the countryside, 'the village of the mind' in Newby's celebrated phrase, from the defilement of modernity, including in this the creation of modern industrial farming systems.

These conflicts are rooted in a number of phenomena: the uneasy transition in Scotland from a feudal clan system to an individualist system of property rights; the juxtaposition in some parts of Britain in the early 20th century of working class demands for access and traditional landowner resistance to any threat to their property rights; and the horror of those in the 1920s and 1930s to the urban sprawl and ribbon development that threatened rural England.

A useful starting point for an analysis of the relationships between country and city is Raymond Williams' (1973) book. A quote is perhaps an appropriate way to acknowledge Williams' profound contribution to our understanding. He writes: 'The country and the city are changing historical realities, both in themselves and their interrelations..... Our real social experience is not only of the country and the city, in their most singular forms, but of the many kinds of intermediate and new kinds of social and physical organisation.'

Williams uses an analysis of English literature and poetry to explore the changing relations of the country and the city, using this literature as a mirror in which to explore the recurrent conflicts and crises that are evident in the history of relations between country and city. He notes that there is a major problem in that ideas of the countryside and the actuality of the countryside may differ. The symbolic importance of the countryside as a place of innocence, repose and tranquillity and as a place of retreat, has been evident since ancient Greece, to which the idea of the Golden Age can be traced. The reality of a

countryside, transformed by industrial farming, dissected by communication routes, penetrated by many diverse forms of economic activity and peopled by urban refugees, stands in stark contrast to the prevalent contemporary imagery of the countryside in holiday brochures and the media.

7.3 Contemporary conflicts in the urbanised countryside

The more proximate roots of many of the contemporary conflicts relating to land and society in peri-urban areas can be traced to the middle years of the 20th century. The weaknesses of the traditional rural economy in the UK, which had adopted a broadly free trade policy in primary produce in the mid 19th century, created new pressures of suburbanisation, at the same time as technological changes in personal mobility began to free people from the need to live near to their work. Terms like 'ribbon development' and 'sprawl' were widely used to describe the development that occurred, with the planning system imposing only modest restraint. George Orwell, writing in the late 1940s observed that: 'ever-growing stretches of beautiful countryside are ruined by planless building, the heavy industries convert whole counties into blackened deserts, ancient monuments are wantonly pulled down or swamped by seas of yellow brick' (Orwell 1947).

These perceived problems of uncontrolled development, coupled with a public commitment to the farm sector in the post war reconstruction, can be seen to lie at the heart of the post-war evolution of the planning system and the creation of a dual planning system, one relating to rural land use and the other to built developments. Curry and Owen (1995) consider that many of the contemporary problems of rural areas in the UK are attributable to this dualism, which is replicated to a greater or lesser extent in most developed western economies. The divergence of the two planning systems makes the reconciliation of competing demands a major challenge for contemporary Land Use Databanks.

The contemporary conflicts can be conceptualised in different ways. It is possible to take a people-based approach or a land use-based approach, each of these from of a range of disciplinary approaches (often including a range of economic, sociological, geographic theories and models). Within these disciplines, there is a range of competing paradigms, sometimes compatible between disciplines, sometimes not. Implications that these competing views (as stated in the call for papers for this conference) can be integrated in a comprehensive way may indicate a triumph of hope over experience. Instead, it may be preferable to explore how different theoretical constructs can throw a little light on some facets of the social, economic and land use conflicts in the urbanised countryside.

7.4 People-based approaches

Few would argue that different groups of people are now making use of rural land and rural social space, compared to even half a century ago, and that it is not only differences in demand but also the (apparent) irreconcilability of these demands that exacerbate conflicts between groups. Such approaches tend to be aspatial, not least because of Pahl's

(1968) assertion that 'any attempt to tie patterns of social relationships to specific geographical milieux is a singularly fruitless exercise'.

The study of people's demands in the urbanised countryside can take on an economic perspective (demand for housing; demand for amenity etcetera), a sociological or even ethnographic dimension (conflicts in the village; the village as a negotiated social construct etcetera (see Pahl 1965; Strathern 1984).

Various arguments have been put forward to explain the expansion of conflicting claims. Most of these are ultimately reducible to demand changes and technically induced supply changes, although the changing composition of 'stakeholders' in the rural arena has also been flagged as an important explanatory factor. The consequences of these changes in supply and demand thus lie at the heart of many conflicts. In particular, there seems to be a long adjustment lag between demand change and supply response, not least a result of endemic market failure in many of the new products and services sought. However, such an explanation is economistic and reductionist. Behind these demand and supply changes lie major institutional changes, reorientation's of property rights and profound social and cultural changes which have had a major effect on the regulatory environment which mediates the processes and patterns of change.

Institutional change

Over the last fifty years, the responsibilities of agricultural ministries have been challenged by the emergence of new institutions. This has had effects on the beneficiaries of the agricultural ministries' largesse. The town and country planning system represents perhaps the traditional bete noir of the rural community, but a range of other institutions in the UK, including nature conservation organisations [1] (English Nature, Scottish Natural Heritage, the Countryside Council for Wales) and informal recreation and landscape protection agencies (the Countryside Commission) have been periodically pilloried by the 'traditional' rural community in location-specific conflicts. The introduction of national parks in England and Wales by a Labour (socialist) government in the 1940s (see Blunden and Curry 1990) and the revival of the national parks idea in Scotland in the late 1990s can be seen as instances by which urban values have been imposed on a 'traditional' rural population with very limited enthusiasm for, and often distinct antagonism to, the project.

A number of other institutional developments have occurred in recent years which have further weakened the position of the traditional occupational community. The Rural Development Commission, an English institution with its roots in the early years of the 20th century, evolved from a body which administered thatching and saddlery courses into a dynamic rural-based development agency, but was absorbed into the new Department for Employment and the Regions in 1997. Many anticipate that this will lead to a dilution of its special rural remit. In the late 1980s, Training and Enterprise Councils in England and Local Enterprise Companies in Scotland had provided new agencies to promote broad-based economic regeneration of Britain, with a remit in rural as well as urban renewal. Their mission was neither rural nor urban. In consequence, there has been a marked tendency towards the dilution of rural-specific bodies. More recently, the promotion of

[1] These organisations have experienced a number of changes of name. Only the latest name is used in the text except where reference is made to their role in a specific controversy.

partnership as a means of development has further weakened the hold of ministries of agriculture on the rural community and there is a now a multitude of agencies and groups active within rural areas of Britain, with much less sectoral specificity and agricultural dominance than was evident in the past.

It would be wrong to see the existing agricultural ministries as unchanging institutions. Not only have agricultural ministries had a significant role in new agri-environmental policy developments, but in Scotland, rural environmental matters are now absorbed within the Scottish Office Agriculture, Environment and Fisheries Department (SOAEFD) to form, de facto, Britain's first ministry of rural affairs.

A different type of institution, the environmental Non Government Organisation (NGO) has constituted a further challenge to the traditional occupational community of rural areas. The National Trust, which is deeply penetrated by the rural (aristocratic) establishment has been a major landowner for many years. However, the emergence of two other conservation-related NGOs, the Royal Society for the Protection of Birds (RSPB) and the Woodland Trust, as major purchasers of rural land in recent decades, and the introduction of radically different management regimes on some of their land, has often created tension with the traditional land-owning community. The extension of the activities of Conservation, Amenity and Recreation Trusts (CARTs) (see Hodge and Dwyer 1996) in the rural arena has often been seen as a threat by traditional landowners and users and reflects a plurality of interests in land over and above its productive potential. This threat can be misconstrued as a conflict between production and consumption uses. Rather it is a conflict between different social groups for access to land of high environmental quality, which has become an important positional good (Hirsch 1976).

Reorientation's of property rights

In a variety of ways, the property rights of rural land owners have been challenged over the last 50 years. The first challenge was in the 1940s when the introduction of development control (the state acquired rights to the control of virtually all development) removed the landowners right to prescribe the nature of the development that occurred on his land, thus removing the scope for unregulated development. However, farmers and foresters were granted generous, but not complete, exemptions from this legislation (the 1947 Town and Country Planning Act) because of the strategic importance of these industries in the post war, cold war period. Over the last 20 years, these exemptions have been progressively reduced, requiring planning permission for a growing range of farm-related developments, and causing considerable irritation to those who believed that their rights to change their land use were rather more absolute than they actually were.

The second challenge was rooted in a pre-second world war challenge on landowners' rights to exclude walkers from access to rural land, particularly open country in mountain and moorland areas. Although there had been a number of earlier skirmishes in different parts of the country, the conflict came to a head in the 'Battle of Kinder Scout' in the early 1930s, when urban-based rambling groups from northern industrial towns organised a mass trespass on Pennine grouse moors (Hill 1980). Legislation in 1949 in England and Wales and 1967 in Scotland provided opportunities to impose access on recalcitrant landowners. This was little used except to establish access over open country in

some parts of northern England and to establish long-distance footpaths in both England and Scotland. However, the present government is committed to access enhancement, which may further compromise landowners rights and remains a significant source of antagonism to the rural community.

However, recent governments have operated a very different policy with respect to the wildlife and conservation public goods on rural land. Since the Wildlife and Countryside Act of 1981, there has been a government willingness to pay compensation to landowners and occupiers to maintain the environmental public goods on their land. The well-documented destruction of highly valued habitat by modern farming and forestry (Warren and Goldsmith 1983) has created major tensions between landowners and environmental groups and been subjected to polemical analysis (Shoard 1980). It has often been argued that the (then) existing system of compensating farmers not to damage the environmental qualities of rural land that another ministry subsidised farmers to destroy, was a bizarre misuse of public funds (House of Commons Select Committee on the Environment 1984).

The reorientations of property rights in planning and access legislation are not isolated examples. They are part of a wider process of regulatory control over rural landowners and users, which include a much greater degree of control over farm pollution, and a degree of control over habitat change of sensitive habitats. The roots of the legislative changes that have brought in these new regulations lie in changing perceptions of farming and forestry and in changes in power within rural society.

Social and cultural change

The changes in property rights and institutions are not isolated occurrences, but part of a wider set of processes of social and cultural change. These changes include new ways of valuing rural resources, driven in many western developed countries by a growing prominence of consumption- rather than production-oriented demands. These demand shifts which are in part a product of the affluence of mature capitalist economies and which depend on high levels of personal mobility to be realised, have been associated with substantial in-migration into some rural areas, have altered the nature of rural economic activity, undermined the traditional pre-eminence of primary land use in the rural economy and have altered the structure of power relations in rural society.

However, attendant on these demand changes, a number of contradictory perceptions and values colour the way in which we revalorise rural space. Industrial farming is generally reviled yet (mostly) we shop in supermarkets that stock the products of industrial farming. We wallow in nostalgic treatments of the countryside in the media and drive our second or third household car along an expanding network of motorways that dissect the ever diminishing 'tranquil areas' beloved and identified by the Council for the Protection of Rural England (CPRE). We climb mountains as an antidote to office-based existences to seek out artificially preserved wildernesses, walking along footpaths that have been carefully constructed to take the rigorous demands multitudes of wilderness seekers dressed in mass-produced mountain equipment. Where the 'organic' attractive countryside of lowland farming has been eroded by market forces and technical change, we reconstruct it with the benefit of grant systems, recreating a counterfeit product that can be consumed

as a fleeting view from a car window, or at a more leisurely pace from the window of a village home.

The production system can and does adapt to new demands. At one level, the industrialisation of farming and farm processing continues. At another, a diversification of sources of farm household income has occurred as farmers have increasingly offered their homes and their land to leisure demands, and have found new niches for old products and for locality-specific products (Slee 1989). Farmers markets have emerged as a significant phenomenon in the United States; box schemes provide organic vegetables direct to peoples' doors; and alongside the search for global competitiveness by some producers, an alternative survival strategy can be discerned, especially in the urbanised countryside. Interestingly, many of the diversifying farm households are not peopled by traditional farmers but by urban refugees or consist of households where at least one of the partners comes from outside farming (Cavailhes 1993, Davies and Dalton 1994).

7.5 Land use based approaches

Spatial models

Theories of rural land use in capitalist economies have provided the conceptual underpinning for a range of models, one of the most widely discussed of which is that of Von Thunen. This model identified transport costs and product value as key determinants of concentric patterns of rural land use around a town or city. The Thunen model has recently been resuscitated by Hite (1997) who argues its legitimacy in a broader rural development field. He notes that special resource endowments may enable areas to be competitive either in food production or amenity provision, destroying the symmetry of the Thunian model, but perhaps creating what Persson (1993) has described as the 'new mosaic of rural regions'.

In peri-urban areas, the Thunian model has long been challenged in view of the edge effects of urban centres. These have been explored extensively by geographers and occasionally by economists (see Thomson 1981). Whilst peri-urban locations might bestow certain benefits on some land users, it is also recognised that it may impose costs on others.

Many geographical models have been underpinned by either environmental or economic determinism. The environment sets obvious limits to potential farm activities which are then considered to take place according to a profit-maximising logic. However, a considerable body of evidence suggests that 'satisfying' rather than profit maximising behaviour is more prevalent in land use decision making, and geographers have explored this satisfying approach in depth to explain why different individuals should respond differently to similar economic incentives. Consequently, patterns of land use may not fit predicted outcomes, unless behavioural variations can be taken into account.

Economic models

Beyond the self-evident assertion that urban uses tend to bid higher prices for land than rural uses, there has been little serious attention by economists given to land use allocation

in the urbanised countryside, although more serious attempts have been made to allocate land between for example forestry and agriculture in the uplands (Department of Education and Science 1966).

The regulatory mechanisms (the right to develop) are controlled by the town and country planning system (members of which profession are seen as anti-economic in their thinking [1]) rather than the rural land use planning system and tend not to be subjected to critical economic scrutiny. Rural economists, in spite of their general schooling in the UK in the neo-classical tradition, have been loath to criticise the economic illogicality of planning control, in spite of the absence of seriously constructed economic arguments to defend most planning decisions. We are left with the paradoxical situation that the outcome which the economists' models would predict and which inform their analysis of intra-rural land use allocative decisions, are neglected or ignored in the analysis of the transformation of land from rural to urban use, and the regulatory mechanism is tacitly accepted. By implication, the regulatory system of town and country planning delivers a preferable outcome to that which would result from an unfettered system of free markets. The defence of rural interests against the threat of bricks and mortar rests instead more with neo-malthusian arguments or rural fundamentalist views, as expressed by Alice Coleman and others in the Architects Journal in 1977, than with profit-maximising logic. Best's (1981) scholarly dismissal of the neo-malthusian arguments may have gained the respect of fellow academics, but one senses it had only a modest effect on those who found the extension of urbanisation abhorrent on grounds of principle.

There is thus little evidence of serious economic inquiry into multiple land use in peri-urban countryside, its causes and the scope for creating new policies to create more efficient and effective policies for multiple use. Such inquiry is not absent, but with the exception of inquiries into attempts to embody environmental concerns into land use policy, the physical interface between what is still thought of notionally as 'rural' land use and 'urban' land use remains neglected by most economists, even if this territory is relatively well trodden by sociologists and geographers.

Thus we can see a geographical approach which focuses on the spatial allocation of land and an economic approach based on the profit maximising use of land which can be applied to the peri-urban countryside. Neither approach to modelling could be anticipated to yield outcomes that might give clear guidance to Land Use Databanks in the transition zone between urbanisation and traditional rural use. The rationalist optimism of post war geographer-planners like Stamp (1960) has long been replaced by a recognition of a plurality of conflicting interests and more reflexive (Giddens 1986) methods of inquiry.

7.6 Changing rurality: a north-east Scotland case study

In this case study, I will first describe the increasingly 'urbanised' rural area in which I live. I will then comment on the market processes that have created changed demands on rural space and the policy and regulatory processes that have steered (or attempted to redirect)

[1] 'Town planners have an all too healthy disregard for the fundamentals of economics. This anti-economic cult is worshipped with almost innate depravity by the planning profession.' Whitby, M. and Willis, K., 1978, pp. 85.

those market processes. I will then try to indicate what conceptual frameworks might be created to realise a better understanding of the observable processes and patterns of economy and society.

Alford, a community of 2,000 people, is 40 kilometres west of Aberdeen. I have lived there for nine years. It is located in a rural landscape of farming and forestry, in a basin in the foothills of the Grampian mountains. The community has a relatively short history. Most of the buildings in the community date from the late 19th century when a branch railway was built speculatively into the area. The railway company ran out of money to allow the railhead to reach the intended community about three kilometres to the west. A community subsequently accreted around the railhead. This community is Alford.

The hinterland of Alford consists of a working agricultural landscape of mixed farming. The detailed history of agricultural development in 19th century north east Scotland has been described by Carter (1979). The area experienced a rapid transformation in the 19th century, in the wake of new communications systems, especially the railway and technical changes in agriculture (the major phase in the development of the Aberdeen Angus cattle breed took place within a few kilometres of Alford). The dramatic expansion of the cattle trade underpinned the expansion of the area. There was a range of farm sizes, with small farmers often being given short term improving leases to break in new ground and larger tenant farmers often acquiring tenancies at a later date and pushing the small farmers onto new ground. However, the small farmer has long since been largely eliminated from a role of significance. The demise is dramatically illustrated in the north east of Scotland's classic regional novel, Grassic Gibbons' Sunset Song (1932).

Service centres grew both endogenously as a result of locational advantage and speculatively as a result of landowner investments to meet the needs of this expanding population in north east Scotland in the 19th century. Railheads were obvious nodes in the system. A cattle market was established in Alford and a range of private service functions developed, including banks and retail outlets. A range of public service functions, including schools also existed and expanded as the village grew. Such a process of expansion was regulated by large local landowners, who were able to control the development process, binding house developers to particular styles and preserving a degree of control over subsequent development through their feudal powers.

From the early 20th century, the hinterland of the area became less able to support the population levels of the 19th century. Technical change in farming reduced the demand for labour, a situation possible exacerbated by a broadly open trading policy with respect to food. Particularly from the 1950s, as depopulation increased, poorer quality hill land was acquired by the Forestry Commission and converted to trees. The rural population density was declining, particularly in the remoter parts of the community's hinterland. Alford experienced modest growth in this period. A certain amount of ribbon development occurred along the main road to Aberdeen, but the village was still essentially a 19th century construct in its appearance.

In the 1960s, as commuting was emerging as a phenomenon in many peri-urban areas, the railway, which was the raison d'être of Alford's growth, was closed down as part of a national rationalisation process. Alford at this time was a sleepy service centre with a few commuters driving or making use of the residual public transport system to get into Aberdeen to work. The village also received a major investment in public sector housing in

this period. The whole region was seen as sufficiently disadvantaged economically in the 1960s to qualify for regional policy assistance. Even in the mid 1970s, there were concerns for the future of Alford. The cattle market had closed as a result of centralising policies by the regional agricultural co-operative and local businessmen were active in seeking and obtaining public investment in museums and country park designation to try to draw more people into the area.

The major transformation in the north east Scotland economy came about as a result of the emergence of Aberdeen as the key UK centre in the development of North Sea oil. The Aberdeen area experienced a boom. Planners struggled to find land to allocate to the new demands of housing and oil-related developments, and allowed satellite towns and villages around Aberdeen to expand and some new settlements to be created. Where public sector infrastructure allowed, (sewerage and water supplies have often been major constraints) rapid development was allowed to occur.

Alford expanded rapidly. Farmers were willing to sell their land to developers and around the edge of the village. About half of the housing in the community is less than twenty years old. The majority of these homes are occupied by incomes, although there has also been a tendency for incomes to move into local traditional style houses and for the traditional population to acquire new homes with the unforeseen benefits of property price inflation that had never been anticipated. Thus retired farmers live alongside oil workers who are off-shore for two weeks out of four; 80 hectare farms have become hobby farms of those who have benefited from the high incomes of the oil sector; the oil elite buy up country residences and use local craftsmen to add conservatories and patios to their traditional homes.

The traditional components of the rural economy are in a state of crisis. BSE and a strong pound have replaced the heady profitability of the early 1990s, and a government broadly unsympathetic to production-based subsidies seems unlikely to intervene in support of farmers, except in payments for the provision of public goods. The forest sector has also shed jobs as a result of technical change. However, in spite of the immediate crisis, a number of farming empires have built up. Small farms have been merged to create dispersed farms under unified control (the best example a farm of 400 ha. employing the farmer himself and one man). Farms have become more specialised as well as larger. Some of the old estates have taken tenanted land back 'in hand' and now run large agricultural enterprises. A significant number of farms have been acquired by non-farmers, whose actions may have had a beneficial effect on land prices for those than remain in farming. Further, there are signs of diversification with a significant area being planted with grant aid from farm woodland schemes.

The economic response to these new opportunities has been mostly at an individual level. Some businesses have flourished, especially small builders, electricians, plumbers etcetera. Local firms have diversified from hardware into antiques and from electrical goods into fast food. There have also been public investments in school expansion. Voluntary groups have promoted a narrow-gauge railway, an agricultural museum, a golf course and a dry ski slope. The public sector has promoted Alford by the provision of village centre improvements such as flower tubs and street furniture and major improvements in sports fields.

Most of the incomes to Alford have moved in as a result of their perceptions of its amenities, which include a country park, the surrounding landscape of farm and forest in a rolling landscape of hills, easy access to ski-ing areas and the higher mountains of the Cairngorms to the west and a perception that they are in a village. Lower house prices compared to the historically important commuter villages of 'Royal Deeside' are also an important attraction for some.

Thus in many ways, Alford is a microcosm of the suburbanisation of rural Europe; potentially illuminating because of the degree to which this suburbanisation has happened over a relatively short space of time. If we can make the connection between smaller milieux and wider structures, and understand our own surroundings and the changes they have experienced, we may be better able to address the wider context.

The principal tensions associated with the transition can be seen in the belligerent defence of farming by farmers threatened with a local nature plan that implied the desirability of access across farmland, a perception by some of too rapid growth, concerns about the lack of availability of low cost housing for low income families, a resentment of 'white settlers', normally English incomes, tensions between young adults belonging to different social and cultural groups, a decline in the widely used vernacular language (the Doric dialect), and the (sub-)urbanisation of the village in terms of new housing styles.

In addition, though it is not widely perceived as a problem, only a small minority of the population now works in the community or within a twenty kilometre radius. The village has been transformed from relatively self-contained service centre to a commuter dormitory. Further, this commuter ownership extends to farms, almost all recent sales which have resulted in non-local, non farming ownership replacing traditional farming families.

There is no perception of a community-wide crisis, in spite of the major crisis in north-east Scotland farming. A fall in oil prices with resultant effects on jobs would be more likely to precipitate a crisis, as house prices would fall introducing problems of negative equity, and there would be little prospect of alternative employment opportunities to soak up any significant labour shedding for the oil industry. Ironically, the other potential factor that might precipitate a crisis would be rising costs of private mobility resulting from fuel tax rises.

Thus whilst farming might be moving slowly towards more environmental sustainability, but experiencing a significant economic crisis that is likely to reduce the number of farming-dependent households still further, Alford as a community is highly dependent on an industry which is exploiting a fossil fuel and prone to significant economic fluctuations because of the location of oil supplies and the politics of oil trading and regulation. Alford is now culturally urbanised but retains some of the visual characteristics of a village, and still has at its social core a minority of people for whom Alford remains their place (Strathern 1984) rather than that of the new residents. The patterns of land use remain broadly the same at a parish level, with the exception of the increased housing and the additional woodland planting on farmland. However, a number of profound social, economic and cultural changes have occurred.

7.7 The scope for overarching theoretical explanation

Attempts have been made to understand and explain the patterns and processes of land use and socio-economic change in the urbanised countryside. The more all-embracing restructuring theories offered rarely provide opportunities for detailed empirical testing within a hypothetico-deductive framework, although we can identify a number of examples of where such theory has been used in economic analyses to inform the evaluation of for example agri-environmental policy (e.g. Whitby et al., 1994). Instead, the overarching theoretical constructs are usually framed in the language of regulationism (Marsden et al., 1993). Marsden and his colleagues argue for a focus on four principal explanatory concepts:

- changing relationships between production and consumption;
- commoditisation of social and economic processes;
- representation as a social and economic process which defines resource conflicts;
- property relations (which provide a 'key structuring mechanism').

They conclude that 'a broad social regulationist perspective' (pp. 173) allows an insightful approach to the examination of these changes, which are better explored at a local level than through sweeping generalisations.

The regulationist approach does not explicitly address the urbanised countryside, although the urban fringe provides a setting in which many of the struggles between competing interests of farmers, middle class residents and housebuilders are fought out, sometimes in an extreme form, and in which new forms of commoditisation occur. Outcomes are seen as a result of the emergence of new forms of regulation associated with the different interests.

We can take issue with Williams (1973) who attributes these changes in the countryside to the maturation of capitalism and to the increased penetration of productive capital into the countryside. Indirectly of course, capitalist prosperity underpins the new demands for countryside, for leisure rather than production space, for housing and living space and the demands for new roads which emanate from a car lobby comprising both producers and owners. In many ways, the contemporary rural crisis is a product of the power of urban-rooted wealth to exercise consumption imperatives over what was in the recent past agricultural production space. These new consumption-related demands are flagged as a central issue by Marsden et al. (1993).

It is the interplay of these competing demands, mediated by local and national forms of regulation, that has created the contemporary urbanised countryside. Not least because of the heavy dependence of the (relatively) new forms of living and commuting in rural areas on the private car, the countryside around towns and cities is heavily dissected by roads. Private, and to a lesser extent public, transport changes have opened up wider expanses of territory to living space, playing space or new industrial location space. The spatial ordering of past geographical models of land use (with some loose connection to the observable reality) may have gone, but there is nonetheless a formless politico-economic rationale to the new peri-urban mosaic of uses.

7.8 Conclusions

- Whether this superficially formless sprawl will be looked back upon as a culmination of mature capitalist achievement or as a regrettable inheritance is unclear. However, in contemplating the likely future views of our present time, we might wish to ask why, at an aggregate level, the land use planning system made such little effort to estimate the full externalities associated with different potential strategies and actions and then embody the results into the regulatory process and why planners had such a blind faith in the regulatory system as it currently stands. We might equally ask why, given the pre-eminent role of agriculture, forestry and other rural land uses in delivering a range of non-market benefits, the managed delivery of these, for example in ESA's and countryside premium schemes, should have been neglected for so long. For all the accusations of economistic thinking by some social scientists, economic logic has played at best a modest role in driving the planning process in the urbanised countryside.
- The regulationist approach has furthered our understanding of why outcomes may not conform with any narrowly defined economic logic. However, all too often, discourse seems to become an end in itself, rather than allowing the 'double involvement' that Giddens (1986) identifies as a central facet of social inquiry. It is rarely, if ever, clear how the regulationist approach might inform planning practitioners of how to address the widely perceived problems of social and land use change in the urbanised countryside.
- Major economic and social changes have occurred in the urbanised countryside which are discernible both at a local level and more widely. These changes are a function of technology and affluence and produce locally variant responses which depend partly on what might be termed local biographies but are mediated by a combination of national and local systems of regulation. Whilst the primary sector retains dominance only in terms of the percentage of space it occupies, a wide range of new employment, mostly based on commuting to urban areas has long since replaced the traditional dependence on farming and related industries as a source of employment.
- These social and economic changes are embedded in a wider cultural change, in which certain enduring cultural interpretations of rural areas are contemporaneously reinforced by new policy instruments as in the recreation of a pleasant countryside through environmental payments to farmers, and eroded by successive waves of incomes, who dilute the social construct, whilst 'consuming' its physical manifestations.
- One area which is likely to emerge as significant in understanding the difficulties of reconciling different land use interests is transaction cost analysis. It is not inconceivable that the high transaction costs of reaching what might be deemed socially efficient multiple rural land use in the urbanised countryside will be a factor in the failure to achieve gains in social welfare through land use planning. The fact that much environmental enhancement on farmland depends on voluntary agreements with landowners, in places where the gains from urban development are very large, raises the negotiation stakes in the search for environmental gain. Further,

if environmental quality is seen as a disadvantage in the pursuit of development opportunity, strategic neglect of rural land may increase the probability of getting planning permission.

- If the challenge to agriculture to create more sustainable agricultural systems in the 1990s has been considerable, the challenge to convert the sprawling land uses and living spaces of the urbanised countryside into more sustainable forms in the new millennium is likely to be much greater. The rhetoric of sustainability, which has, alongside budgetary arguments, been used to constrain agricultural productivist policies, has already been applied to cities and other policy and planning arenas to a modest degree. The urban fringe and the urbanised countryside, which have often been subjected to regulation of development through green belt and other policies, have nonetheless been subjected to enormous transformations in land use in the last fifty years. It seems probable that the next fifty will expose some of the contradictions inherent in the lifestyles of the residents and users of the urbanised countryside. The attempted resolution of these contradictions between the search for sustainability and the desire of rural living space will be mediated by both national and local regulation, the nature of which will depend on the prevailing patterns of political power and the capacity of mature capitalism to survive in an increasingly challenging environment.

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Methodological papers

8. Methodological papers: overview

Roland Goetgeluk

We consider methods not as a goal, but as a means to answer research and policy questions. This is reflected in the contributions. In this summary we put the emphasis on the policy and research questions for which the method is applied. The summary must trigger to read the contributions.

The paper of Chang Ting Fa and Piccinini of the University of Udine (Italy) reflects the need of a model that predicts the future spatial flows of people, goods and information. Why? Such a model reveals how cities, countrysides and regions become more and more connected to each other in time and space.

Their method, Cell Mapping, is derived from the physics of chaotic dynamic systems. The fuzzy method is fairly data-driven, although assumptions behind 'cluster' process are important. The results show a clustering of cities, countrysides and regions into functional regions, as well as the structure within the regions. The authors remain down to earth with regard to the predictive value of their method. Firstly, they claim that describing the development of a system is not the same as explaining the critical events that trigger new landscapes. Secondly, they argue that their contribution is part of a long-term research agenda.

The contribution of Ligtenberg, Beers, Goetgeluk and Van Rijswijk of the Netherlands Agricultural Economics Research Institute starts with the observation that the Dutch countryside has become the arena of many different stakeholders. Hence, they argue that spatial planning must take this heterogeneity in stakeholders' behaviour into account. They use a Multi-Agent-Simulation (MAS) to model individual choice behaviour. An agent is a system that tries to fulfil a set of goals in a complex dynamic environment. The MAS has fruitfully been used in industry to manage complex distributed processes as well as in environmental research. Cellular automata (CA) calculate the aggregate outcomes, such as environmental pollution as a result of land use change. The socio-economic effects can be modelled directly in the MAS. The model helps policy makers to analyse ex-ante the effects of measures.

Polman and Slangen analyse within the framework of the new institutional economics and the transaction cost theory (contract theory) the several institutions of governance and type of contracts in nature conservation. They focus on the role of the farmers. The starting point of their analysis is the governance structure: 'the identification, explication and mitigation of all forms of contractual hazards'. Three structures exist: the pure market (invisible hand), the pure hierarchical structure (organisations) and the hybrids. Three ideal typical contracts exist: the classical (price clears the market, degree of asset specificity and complexity of safeguards clauses are not important), the neo-classical (price, degree of asset specificity and complexity of safeguards clauses are equally important), and the relational contract (price is not important, degree of asset specificity and complexity of safeguards clauses are extremely important).

The authors clarify how contractual hazards in Dutch nature conservation can be identified in advance. Hybrid and hierarchical forms and relational and neo-classical

contracts dominate. Although the ultimate question 'which contract form serves best the goal' is not yet answered in the paper, the presented economic framework classifies the different nature conservation forms and their potential dangers.

Vanslembrouck and Van Huylenbroeck analyse Belgian farmers' willingness to accept three hypothetical countryside stewardship policies to preserve and/or develop the (former) agricultural landscape. They use contingent valuation method (CVM) which is often used to measure the willingness to accept (i.e. the deterioration in environmental provision) and de willingness to pay (improvement of the landscape) of *consumers* (residents). The valuation is contingent because the questions are designed according to hypothetical markets or situations. Vanslembrouck and Van Huylenbroeck survey *farmers*. The farmers' responses are monetary bids. These are used to determine shadow prices of environmental gain of loss.

They confront 347 Belgian farmers with three options: farm beautification, field beautification and unsprayed field margins. The surveyed farmers are not very interested at all. Partially, this is explained by the method itself. Partially, it seems that involvement in the 'beautification process' grows if farmers take part in the whole planning process. Last but not least the explanation is found in the analysis of structural and farm economic data.

In the last paper, Verhaegen and Van Huylenbroek study Flemish farmers markets near Brussels where farmers sell their products directly to consumers. Their goal is to optimise farmers' earnings, to promote and sell regional products and to give consumers fair prices.

They apply a model based on the transaction costs theory to compare the revenues, the production and transaction costs of these new markets with the ordinary ones. A transaction cost is the 'exchange that occurs between two stages of the production/distribution chain as the product changes in form and/or in ownership rights'. Each transaction is characterised by the asset specificity, the uncertainty and the frequency. Activities are negotiating, safeguards of an agreement, performance measuring etcetera. The management of the transactions is the governance structure. They compare different strategies of marketing with respect to the three characteristics. They postulate that bounded rationality (the *homo economicus* does not exist), opportunism, uncertainties and small numbers of agents increase the likelihood of market failures and transactional hazards.

Farmers and consumers benefit from the farmer markets. Why? Farmers want a fair reward for their highly specific work. The best way is a direct relationship between farmer and producer. This is impossible on the common market: anonymity and prices dominate the market. A farmers market economises the transaction costs compared to selling at the individual farm. Further it strengthens the 'rural idyll' as a product.

9. A new Method for Analysing Urban-Rural Interrelations through Commutation Data

M. Chang Ting Fa - L.C. Piccinini

Abstract: In order to give a contribution to the problem of defining urban-rural interrelations, the authors use census data concerning daily flows of commuting workers. Hsu's Cell-mapping method, transferred from physical dynamics to areal analysis, allows us to obtain a consistent hierarchy of clusters of municipalities. Some archetypes of areal interrelations emerging from this analysis are described, and it follows an overview of the results obtained working on the whole of Italy. In the case of Milan metropolitan area a comparison with other methods shows that Cell-mapping is sharper in analysing urban-rural competition and therefore it can be used to help the decision maker.

9.1 Introduction

Developing policies for rural and peri-urban areas highly depends on assumptions behind the way urban-rural interrelations evolve in time and space as well as the valutation of the economic, social, cultural, spatial effects of these interrelations. Further, it seems sound enough to state that the people translate the words urban, rural, peri-urban in sociological, economical and moreover in geographical terms. This implies that methods that help policy-makers to discern what is rural, urban, peri-urban (clustering procedures) should be treated carefully [1].

This methodological paper is concerned with this problem of clustering. It presents an alternative method of defining urban-rural functional ties based on dynamical flowdata collected in censuses: Cell Mapping. This method was originally developed in studies of dynamical systems in physics, which have been a fruitful source for many geographical methods like gravity-models. We transfer Cell Mapping method to the analysis of territorial flows, thought of as a weighted oriented graph. A graph is defined as a set of locations with relations between pairs of locations. The graph is oriented because flows can have two directions and the graph is weighted because the flows may differ in intensity. We use this method in a case- study: the whole territory of Italy.

Why do we think that Cell Mapping method is better than methods that provide a hierarchy of towns, or other models that aim at splitting territory into homogeneous parts? Both of them are relevant for the analysis of urban-rural interrelation, but are not fully satisfying, because they tend to overestimate the role of main towns in the organisation of neighbouring territory, not distinguishing sharply those areas that have preserved a rural

[1] Two remarks are important. First the clustering is important from the perspective of policy makers authorities, like for instance the ministry of agriculture and the ministry of economic affairs, irrespective the knowledge that urban-rural interrelations are continuous rather than discrete. Second the interrelations of functional ties (flows of people, goods, ideas etcetera) have geographical component (daily urban systems, market for products, market for ideas by means of, for instance, local radio and television stations, etcetera) and vice versa (the geography determines also the functional ties).

characterisation (space, silence, beauty) even if they are included in metropolitan areas. In section 9.7.2 we present the important case-study of Milan area where our method allows a sharper analysis. Furthermore another main disadvantage lies in the fact that all these methods depend heavily on a set of threshold values that are 'suggested by the experience'. This means that it is essentially possible to change the results of the analysis according to personal tastes or hopes, or anyhow according to previous knowledge.

The paper is structured as follows. In section 9.2 we briefly recall some methods used in territorial analysis, especially those that use the same data as we do. Section 9.5 is devoted to the presentation of Cell mapping method in our new interpretation. It focuses on the theoretical and methodological aspects. Section 9.7 shows the application of the method: the analysis of the whole of Italy. In section 9.7.1 we present a general overview, while in Section 9.7.2 we discuss in detail the results obtained in the main metropolitan area of Italy, namely Milan, where another important wide-scale analysis (Forleo, 1998) seems not to be so sharp as ours. These results in particular are presented here for the first time. The last section is conclusive.

The computational software is entirely new and has been implemented by the authors. It is specifically intended for the management of big sets of data that cover a whole national territory.

9.2 Overview on some methods used in the analysis of urban systems

Very often in the analysis of spatial systems one can dispose of several areal data. The interrelations between these data for each area usually allow a classification and the following construction of clusters of towns with similar performances. Gluing together all the information's thus obtained, in many cases it is possible to highlight larger areas which share the same socio-economic structure, and also to bring into evidence the stronger and the weaker parts of a region, the presence of country and agriculture, and the survival of ecological and landscape corridors.

But the question that should arise is whether spatial analysis alone can lead to a complete study, especially in the case of highly urbanised regions or metropolitan areas, where the impact of urban systems can no longer be summarised into a few indicators but requires finer techniques of analysis that take into account functional ties. When we speak of urban systems we no longer investigate the single properties of towns or municipalities but we rather try to understand their mutual interrelations, finding hierarchies and putting them together into clusters. Interrelation between towns and territories may of course be physical, involving movement of goods and persons, or immaterial, moving money and information.

The knowledge of interrelations in a region or a nation adds remarkable information to the simple description of the local properties, and throws light on many perspectives of evolution, thus allowing the possibility of planning, control and organisation. Remark that interrelations not only allow to create a hierarchy of single towns, but rather lead to identify groups of interconnected towns, and hierarchies between them.

Why is it difficult to deal with groups and hierarchies? Because there are so many possible interrelations that it is almost impossible to get good estimates for most of them,

and moreover it becomes very difficult to make any sound use of this plenty of data. Census has privileged one of the physical interrelations, namely the home-work and home-school daily commutation data because of their social and economic relevance. At present, in a frame of high mobility, this datum can well summarise on one side the leader role of metropolis and the strong attraction of main towns, and on the other the intermediate position of small towns and the satellite role of small rural municipalities (ISTAT, 1991). Of course some perturbations can be found (but are also easily explained) in the presence of big insulated industrial districts, but anyhow this seems to be a very meaningful set of data, that can throw light also on the future evolution of a region, because a constant interrelation between towns may imply also long period social consequences, like diffusion of information and habits, arising of friendships and marriages. School movements are also very important, but they seem to be very stiff, reflecting almost exactly the consolidated hierarchy of cities, and not reacting to new evolutions. However also this set of data is available on the same data base.

From a technical point of view the set of flows can be represented in a weighted oriented graph: a set of locations with relations (such as commuting flows) between pairs of locations, in which one is the origin and one is the destination. Furthermore we also know the interior flow from the location into itself. Since all flows (even of a single person) are registered the graph is very crowded, and therefore it is necessary to reduce it into more useful data. Clearly this is the most critical point. There are essentially two lines of analysis: the first one rearranges the outgoing flows starting from the greatest and then takes into account only some of the first flows, or even only the first flow. The other line puts some a priori absolute or relative thresholds below which a flow is no longer considered meaningful.

9.3 Hierarchies and provinces of work

Usually models that look for a hierarchy take into account only the greatest outgoing flow, with the further restriction that it must be directed towards a greater town (compare e.g. IRES, 1988 and IRSEV, 1983) With this condition surely the graph is reduced to one or more hierarchical trees. According to the thresholds that can be imposed, the original trees can be splitted into smaller (and usually more significant) ones. For regions not highly polarised this method can provide interesting information, since it builds a multilevel hierarchy, but it practically loses any use when there are metropolitan attractors, since in this case almost all the towns appear to be directly dependent from the metropolis (e.g. Milan, Rome).

Another method is used by ISTAT (Central Institute of Statistic of Italy), in order to create clusters, the so-called 'Provinces of work' (ISTAT, 1997 and in particular Sforzi, 1997). In this case all information about entering and outgoing flows is summed up and compared with interior workers. Self-containedness is the ratio between the in-workers and the total number of workers living in the municipality, while attraction is the ratio between workers that come from outside and workers that commute starting from the municipality. Towns are listed in descending order according to this two indexes, and the first part of them is considered 'candidate'. Starting from the top of the list, towns are subjected to a

check of performance, including the need of avoiding excess of attraction; if they do not satisfy this first check they are glued together with other candidates which show the greatest connection in both directions. This cluster is considered as a single candidate and tested again, until it is accepted or modified, expanding it, or gluing it in some other way. The procedure is repeated until it becomes stable. If a cluster, after all the possible changes of the system, does not satisfy the test, it is definitively rejected. In this way the method constructs a set of 'roots', that can be formed either by single municipalities or by clusters of municipalities. All the remaining municipalities are associated exactly to one 'root', according to the best commutation rate. The final result is considered as the system of 'provinces of work', and thus exhausts all the municipalities. As one can see in this case there is no attempt of hierarchy.

What is striking is the high variance of these 'provinces'. In 1991 (last census in Italy) they are 784, a number intermediate between 105 provinces and 8,100 municipalities, but the number of inhabitants ranges from over 3 millions (Rome and Milan) down to 5 thousands. Variance is less than that of municipalities, where at the top there is Rome with 2,773,000 inhabitants and at the bottom there are 6 municipalities with less than one hundred inhabitants. We note that the population of administrative provinces ranges from 3,700,000 (Rome and Milan) down to 91,000 (Isernia, in Molise).

Of course it is possible to reinterpret ISTAT results if we consider the flows that move outwards starting from the 'provinces of work', so that we might create a hierarchical structure, thus putting small units at a lower level than big units. It is to be expected that only some small mountain districts maintain an autonomous position, while all the remaining should appear as satellites of bigger provinces.

9.4 Criticism: the need of fuzziness

Both methods have the disadvantage of not allowing 'grey' areas of mixed influence or transition areas because the one tends to create a pure hierarchy, the second a pure partition. We think anyhow that this is not the main disadvantage when dealing with an analysis of urban-rural relationships. The fact is that both methods perform poorly in the neighbourhood of big cities, where the attraction of the centre outshades any other form of connection.

It is important to look what happens in the neighbourhood of the main towns, where the competition between urban and rural environment is stronger. At first sight there is only one attractor, the city, from where most information and habits are taken. The single small municipalities seem to share the same characteristics. They seem not to communicate directly between themselves and not to be able to defend their own characters because of their small dimensions. But if it happens that these boroughs have a strong communication also between themselves, their capability to control urban expansion (physical, psychological and social) should be improved, directly or through influence upon opinion leaders. In order to investigate this form of intercommunication it is thus necessary to take into account also the rivulets of people that commute from one borough to another. Of course it is unlikely that there are long distance movements, but it is to be expected some flow between adjoining municipalities; if it is possible to build a chain of local linkages,

then its effect will be slower but similar to those of direct connections, since information and habits propagate even if the bearer changes. Thus paths, and especially cycles, in the connection graph become of the greatest interest, so single data should be preserved and analysed. There is obviously the risk that in order to avoid the oversimplification of reductionism we fall into the opposite error of becoming holistic.

9.5 A new procedure in urban system analysis: Cell Mapping

Cell Mapping method was created by Hsu in 1980 as a tool for the analysis of chaotical dynamic systems, where it is very difficult to preview the evolution with respect to time since it heavily depends on initial conditions. The main idea is to discretize the space into a finite number of subsets, named cells, supposing that evolution no longer goes from one single point to another, but globally from a cell to another one. In our case of course we are already in this situation if we use municipalities in order to build the system of cells.

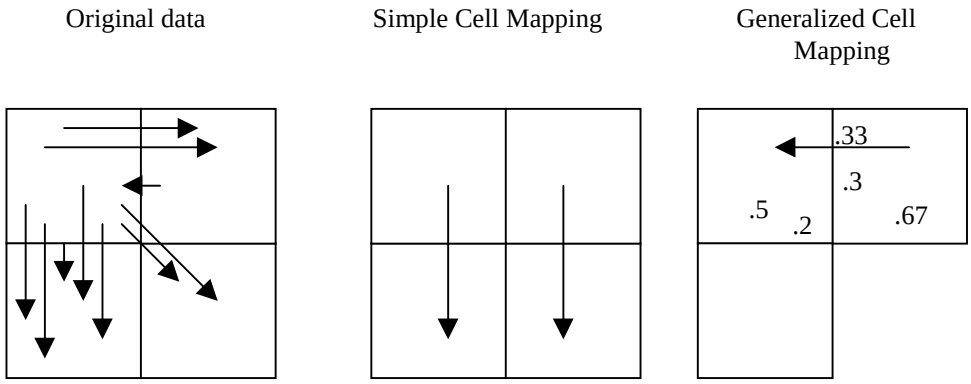


Figure 9.1 How Cell Mapping simplifies original data

Cell mapping simplifies the structure but allows a global study, since it analyses both the space of equilibrium configurations and the set of initial conditions that lead to them (attraction basins), adding information about the speed of convergence to them.

9.5.1 General approach to Cell Mapping

In the original version of 'simple cell mapping' there was only one destination from each cell (in some cases the cell itself), thus the structure of the system was essentially built up by one or more trees, in which from each brench we descend down to the root. The root could be formed by a single cell, if its outgoing flow was directed into itself, or by a loop of cells that were run one after the other. All the cells not belonging to the roots are unstable, because the flow goes outside and never returns back.

In our study we always consider the greatest flow going out from the municipality, and not the flow directed into the municipality itself, so the roots cannot be formed by a single cell. It follows that there is a slight difference with the creation of hierarchical trees, because here all the roots must be formed at least by two cells, and, actually, very often we find binary groups formed by a city (it would be the root in a hierarchical tree) and a borough near the city towards which most persons commute. Usually the number of those persons is negligible in comparison with the number of those who remain to work in the city, but all the same this datum gives interesting information about a polar direction of potential expansion of the main city. There are non trivial cases of twin cities that emerge from this analysis, namely Venice and Padua, Leghorn and Pisa, Pescara and Chieti.

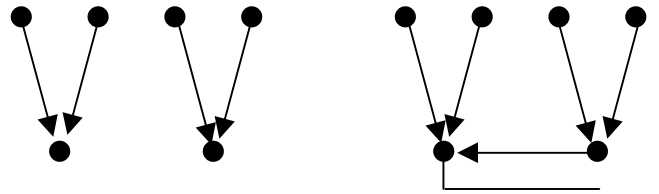


Figure 9.2 Difference between hierarchical trees and Cell Mapping

When the first flow is directed far outside of the town, it means either that there is a strong attractor (usually a metropolis) or that the neighbourhood of the town has so weak economic structures that the main flow is directed far away towards a more vital town. This satellite role is typical of many small towns, but sometimes it characterises the relative economic and structural weakness of some towns that are head of a province (for example Gorizia, near Trieste and Lodi, near Milan).

9.5.2 Generalised Cell Mapping

The elementary structure provided by simple cell mapping becomes much richer in Generalised Cell Mapping, where to every cell it is associated a greater number of possible connections, and each of them is characterised by some weight (or flow), according to which they are ranked from the greatest downwards. We can thus enrich our graph of relations, taking two connections, and then taking three connections and so on; otherwise we can state a threshold under which a connection is considered not relevant, and then we can enrich the graph taking a lower threshold.

What is important in the method of cell mapping is that the graph, that originally was reduced to its essential structure, step by step is enriched but remains consistent, that is at each step all the previous connections continue to be present. This leads to the possibility of recognising all the previous structures as a guide to understand the new structures that usually become more complicated and contain the simpler ones in their interior. This fact also allows us to classify the higher order structures in a natural way, avoiding to establish

arbitrary thresholds. Of course in a further analysis it is possible to take into account also numerical indexes, just as in other theories, but it is important that we do not fix thresholds before analysing our graph, thus not risking to lose new structures that could bring into evidence phenomena not discovered by other methods.

According to the nature of the problem (and also for computational reasons) usually one never goes beyond the level of four flows, mostly using two or three flows. In the case of commutation flows the level of two flows gives information's at the level of the interior of provinces and allows to perform subregional analysis; the level of three flows gives information's about the structure and relations between different regions, while the level of four flows highlights some national phenomena like the fracture between Southern Italy and Northern and Central Italy, or the different structure of north-eastern and north-western regions, and the special role of Milan metropolitan area.

But what are the structures we should look for? Essentially structures of strong connection and structures of dependence (hierarchical or multiple). Two fundamental concepts of Cell mapping theory are persistent group and transient group. A group is a set of points that are connected one to another by a path (of any number of arcs) with the condition that all paths must touch only points of the group, not being allowed to go outside. Roughly speaking when you enter into a group you may visit it completely, but if you leave it (provided you are allowed to) you can no longer come back. A group is called transient if there exists at least one point outside the group that can be reached from it. Of course it does not exist any way back, otherwise the new cell would belong to the group. Groups that are not transient are called persistent, and are the only attractors of the system, that is, while in a transient group there is the possibility of leaving it, when you enter a persistent group you cannot leave it. The localities that belong to a same group have the property that their connection goes in both directions, so that it may be more relevant than a pure hierarchical dependence; the difference with other theories is that in Cell mapping the double connection needs not to be direct, but it can pass through a greater number of arcs. It is of course possible to introduce measures for the strength of the interconnections, and to define distances.

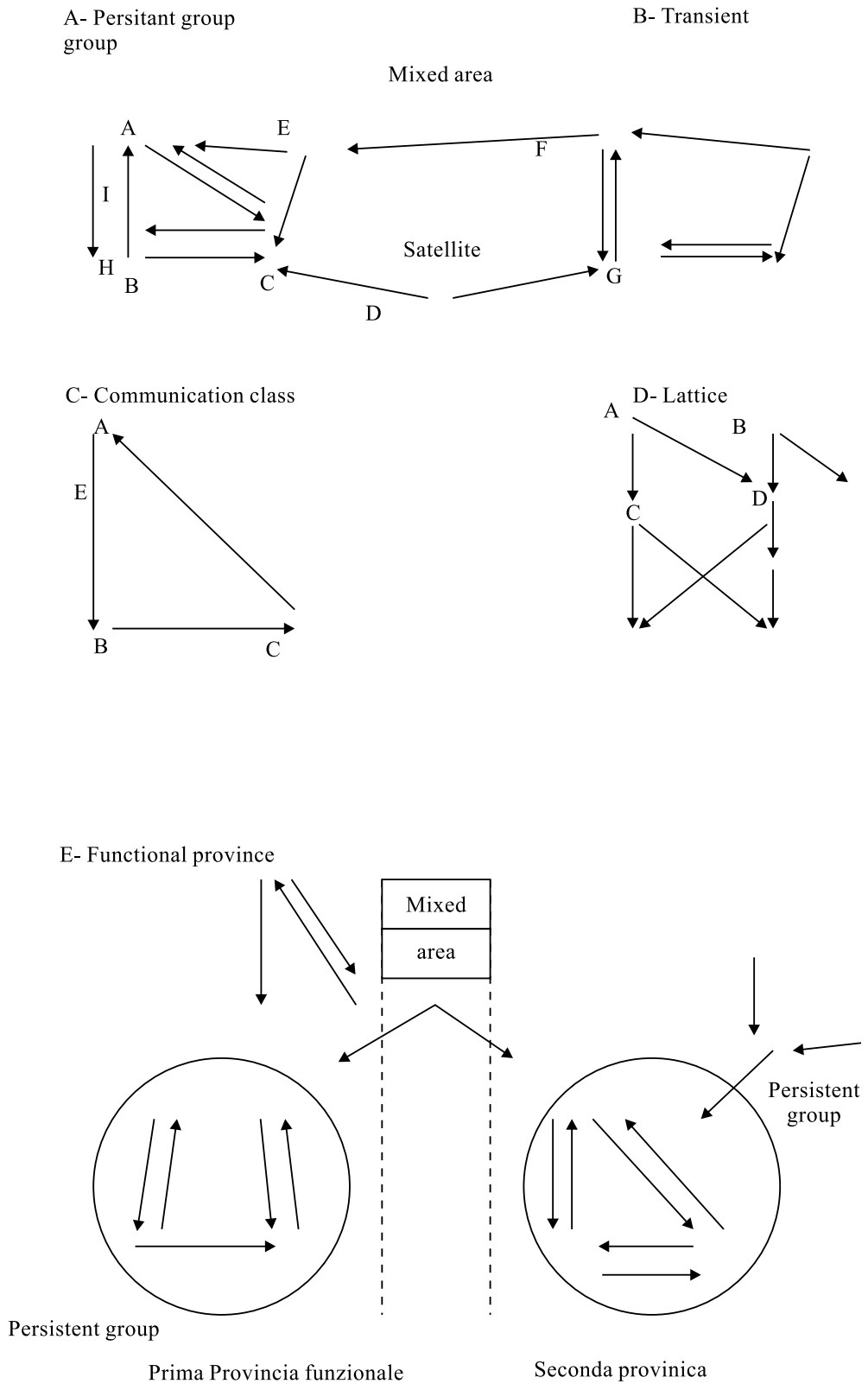


Figure 9.3 Group typology in Cell Mapping

Among the cells that do not belong to any group there is the subset of the so-called satellites. Here a hierarchy arises in a natural way: the absolute (or first order) satellites are those at which no path arrives, the second order satellites are those at which only paths coming from first order satellites may arrive, and so on. The remaining cells belong to paths that connect a transient group to another group. From a hierarchical point of view they have a role similar to that of transient subgroups, so we prefer to call them trivial transient groups. Remark that when no threshold is imposed on data there cannot exist trivial persistent groups, but they usually arise when a threshold is imposed, and of course they correspond to the main cities. Usually the higher is the threshold, the larger becomes the number of trivial persistent groups.

9.5.3 The reticular structure

The system formed by groups and satellites builds a lattice, in which there exists a relation of order, while in the original graph, even in simple cell mapping, it could not exist, since inside any group there cannot be a strict order relation because there are always circular paths. Of course it is possible to triangularize also the original connectivity matrix, in the sense of finding a rearrangement of rows and columns such that it minimises the weight of those branches that happen to be inconsistent with the pseudo-order thus created (the elements that lie over the diagonal). This problem usually arises in the study of input-output matrixes, and was firstly solved in a non heuristic way by the authors (Piccinini, 1996, and for an analysis of sensitivity Chang Ting Fa, 1996).

Only in simple cell mapping surely the order is supported by hierarchical trees, while in generalised cell mapping mixed areas usually arise: they are formed by transient groups and satellites that have paths leading to two or more different persistent groups; even paths leading to the same group need not to be unique. Anyhow for any group, both persistent or transient, there exists a subset formed by those cells from which only that group can finally be reached. We call this set functional domain of the group.

In our context, it is suggestive to rename functional province the functional domain of a persistent group. Usually the functional domain of a transient group is very small, or even empty, because if the transient group, say A, goes into another group, say B, that very often is a strong attractor, then it may happen that all those cells that go into A shall go also into the attractor B, thus not belonging the (exclusive) functional domain of A. So it can become useful also the notion of relative functional domain: it is formed by those cells that go either into A alone or into A and B, but into no other group.

If A goes into more than one group of course the definition is changed in order to allow all those groups as a destination in addition to the compulsory destination, namely A.

As we have said before the results of application of cell mapping analysis with one, two or respectively three flows may be made consistent provided we do not change the thresholds. So in particular it becomes of deep structural interest to compare the groups obtained with three flows (called from now on groups of level three) with the groups obtained with two flows (groups of level two). All groups of level two are contained in some group of level three, but very often groups of level three split into two or more groups of level two, loosing also some cells that become satellites at this lower level. It is also typical that some very weak groups of level three no longer exist as groups of the lower level; this fact happens also for some middle level towns in presence of strong metropolitan attractors.

When we created the software for this application of Cell mapping, we remarked that a lot of computing time was spent in finding groups, in particular transient groups. It has thus proved a good policy to start from cells that correspond to the main cities and to find their groups, that generally happen to be persistent.

Afterwards we search for groups that contain middle towns and only in the last we look for the remaining groups. Once the groups are known, all other procedures are straightforward, even if sometimes they are rather annoying because of the great amount of data that are to be worked together. Up to the level of four flows the method worked without any threshold, even if it needed some computational refinement, so we never renounced to our principle of avoiding arbitrariness.

9.6 Cell Mapping in territorial analysis

The theoretical frame of section 3.1 could be applied to any system of interconnections, inasmuch it does not require any geographical reference, even if some kind of mapping can be used in order to synthesise the results. A topological analysis is already present, but at a purely abstract level, without any metric reference. The experience of geo-economical studies, starting from the essays of Ponsard (Ponsard, 1967 and 1969) shows the importance of the connection between the structural scheme and the geographical reference. Therefore in this section we show some further developments that can be achieved when we explicitly add to information the geographical co-ordinates of municipalities.

In order to analyse urban-rural competition it is important firstly to distinguish between 'compact groups' and 'sparse groups'. Usually municipalities that attract a workers flow should not be purely rural, unless they are surrounded only by such municipalities, in which case some erratic short length flows can arise. Hence when there is a frame of towns and boroughs that belong to a group and fill the territory spanned by the group (a 'compact' group), we must expect that there is little room for agriculture and that most of the territory is urbanised. On the contrary if we find many satellites that spot the territory of the group, we are in presence of a mixed area, where country still has its role. Of course these results must be critically compared with all the properties associated with the single municipalities.

A particular problem arises when the extension of municipalities is systematically non homogeneous. In Italy, for example, rural municipalities in Lombardy and Piedmont are much smaller (and much more) than in Emilia or in Puglia. But, on the whole, the neighbourhoods of the towns, that form the main object of the research, are homogeneous enough and can be usefully compared.

Some further situation of 'sparse' group can arise when many transient subgroups are inserted in the territory spanned by the main group. Theoretically this fact ought to indicate a superposition of a reticular high level system (Boudeville, 1961, 1968 and Perroux, 1955) over a traditional system based on Central Places theory (Christaller, 1993).

9.6.1 Analysing the interior of groups

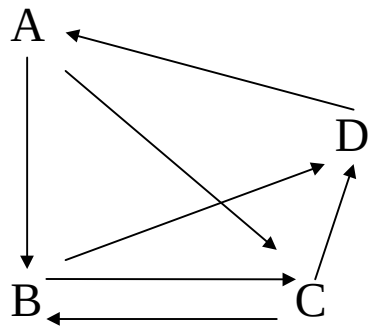
We try now to analyse the interior of groups. In principle there could be groups with one principal attractor and groups with many principal attractors, but this last situation is more likely in the higher levels of the analysis; actually in section 4 at level three we shall find both types, and in particular the group of Venice is the most 'sparse' and shows the astonishing number of 9 attractors. The problem is the following: it is obvious that almost all the non-attractor members of the group have a path that leads to one or more attractors, but up to what level have they direct paths connecting them without touching any attractor? The presence of such paths of course would imply a loss of polarisation of the group, and a relative weight more balanced between centre and periphery.

Thus the detection of such connections becomes relevant in order to foresee the lines of urban development and the capability of defence of the rural neighbourhoods. From the mathematical point of view we could look for subgroups that are hamiltonian, that is sets where there exist a circular closed path connecting all the elements passing exactly once in each of them. The maximal hamiltonian subgroups (in general there are many of them) can thus show sets of municipalities that share a connection stronger than the simple group property.

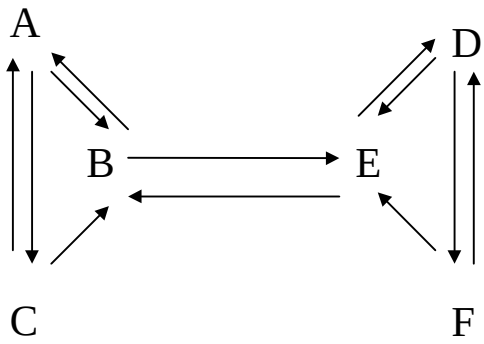
Remark that the importance of hamiltonian paths was pointed out in economical and geo-economical studies especially by Gazon (1997) and Lantner (1974) in the line of thought started by Perroux (1948). Maximal hamiltonian subgroups need not to be disjoint and usually they share at least one attractor. This fact could be used to give a functional definition of attractor areas, namely intersections of maximal hamiltonian subgroups. It may happen of course that small groups are themselves hamiltonian, in which case of course they are maximal, but this fact very seldom happens for the main persistent groups, actually only Florence and Trieste have this property, and Rome goes very near to it. As it can be easily seen these groups have the main attractor at one of the ends and spread out only in a limited triangular sector of directions. When the attractor lies in the geographical centre of the group, maximal hamiltonian subgroups usually divide the circle of directions in two or three sectors having their vertex on the attractor. The radial corridors that separate the sectors are expected to be either empty or filled with satellites. In case satellites are of first or second degree in can be expected that the corridor has environmental relevance.

The analysis of maximal hamiltonian subgroups leads often to the splitting of multiattractor groups into smaller subgroups obtained gluing all the maximal hamiltonian subgroups insisting on the same attractor. The comparison between this functional form of splitting and the simpler splitting into groups of level two provides further interesting information in the case of very complicated groups.

A – Hamiltonian Circuit



B- Non-Hamiltonian Circuit



C – Hamiltonian Circuit in Florence group

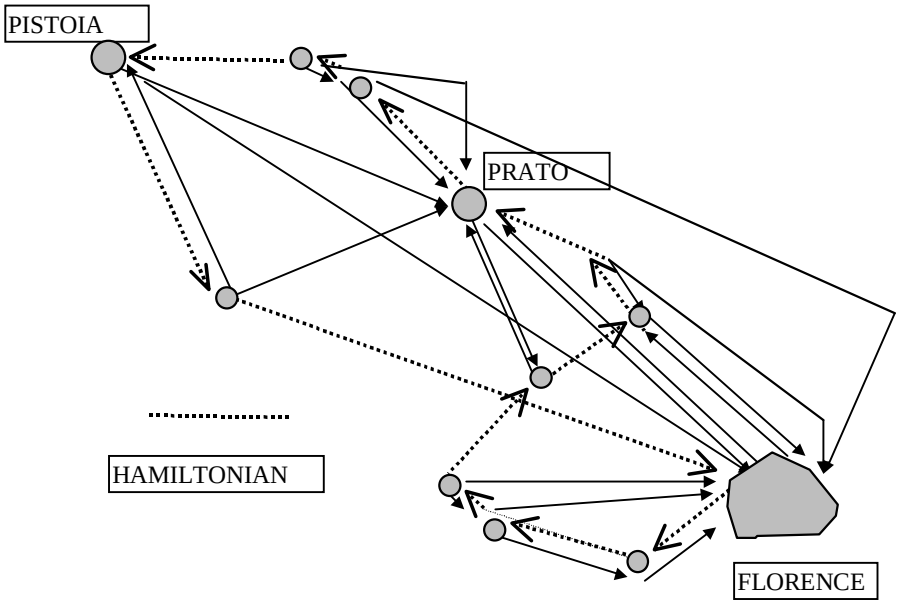


Figure 9.4 Hamiltonian and non-Hamiltonian Circuits

9.6.2 Radial and transversal chains

Complementary, in a certain way, to the research of hamiltonian groups is the analysis of chains (compare fig. 6 in section 9.7.1). We consider now only those flows between two cells that go in both directions, and study the corresponding interconnections. Of course there is plenty of couples of cells that satisfy the condition, thus we shall reserve the name of chain for those cases in which at least three adjoining cells are doubly connected.

A particular case arises when three cells (or even four cells, but at level three this happens very seldom, and at level two this cannot happen at all) are doubly connected two by two; this fact shows a correlation exceptionally strong between the three cells, so that they could be functionally considered as a single cell. Of course we are interested in maximal chains. The direct analysis of our results has lead fundamentally to identify two important types of chains, radial chains and transversal chains. Radial chains start from an attractor and move outwards usually along a main road, or along a valley or a river. The presence of radial chains was to be expected, but what is important is to check the place where the chain breaks (if it breaks at all) during the connection between two attractors. A break means either that some place is too weak to be an attractor for both directions of the road, or that some brenching took place, and that brenchs were more important that the very places along the road.

But the more relevant chains are the transversal chains. They join places lying on an arc of circle around an attractor. This fact in a very polarised context should happen only accidentally, since a radial chain already requires two flows, and in order to get a transversal chain we need two more flows. Therefore in the three level analysis radial chains and transversal chains are mutually exclusive. This fact leads to a structural selection of the radial chains starting from the attractor or from its immediate neighbourhood, defining the main directions of evolution in depth, while the transversal chains show the evolution of the attractor in breadth. The commonest case is when two different radial chains are joined by a transversal chain, thus forming a particularly compact subsector, centred on some line that is tangent to the main city at a certain distance (usually 10 up to 20 km). The transversal chain anyhow, provided it is long enough, forms some kind of barrier that protects the country lying on the outer side with respect to the main attractor. Thus we do not find an environmental corridor that can penetrate near the city, but conversely is very narrow and vulnerable since it is compressed between two radial chains. We rather find environmental circles larger and more compact, even if they lie somewhat farther from the city itself.

9.6.3 Satellites

As for satellites we can remark that those of the first two degrees usually share some properties of Christaller's Central Places theory, so that very often they can be representative of non-structured country, or of mountain regions. The coefficient of selfcontainedness of workers can allow a sharper classification, distinguishing residential peri-urban areas from non-industrialised country. Higher degree satellites should represent in general knots that can express a certain attractivity for the neighbouring country, but are not able themselves to give employment in high level jobs, that must be searched therefore

far outside in the cities. Usually a district where a knot arises is not highly industrialised, otherwise the main outgoing flows should not be directed far outside, and transient groups should arise. Even if low degree satellites, in particular absolute satellites, usually imply that density of population is low, in the neighbourhood of main cities this condition need not to be fulfilled. A last remark is that the main touristical resorts usually are not low degree satellites, but on the contrary very often they succeed in forming transient groups. Very insulated groups of municipalities, not having flows going outside usually form small persistent groups, that practically have no structural meaning. But in this case a simple analysis of the total number of inhabitants can lead to a more correct classification.

9.7 Overview of the results of Cell mapping method applied to Italy

Now we present a short overview on the main results we have found applying Cell mapping method to the Italian system. We devote the first subsection to general results, while the second will deal with a more detailed analysis that appears to be suitable for the peri-urban areas.

9.7.1 General results

For a general analysis the Cell mapping level that gives the best information's is level three, because it can express links that overcome a strict regional highly polarised dependence. Superior levels on the contrary tend to give very generic information's, that become specific only near metropolitan areas. Moreover outside these areas it seems that some erratic behaviour (that could be theoretically explained using the Central Places theory), tends to disturb the main structural phenomena.

9.7.2 Overview on groups in three-flows analysis

We begin with three flow analysis. The number of persistent groups, as it was expected, is very low. The main of them are Rome (that is extended to include also Latina), Milan, Venice (a huge group containing also Padua, Vicenza, Treviso and Pordenone), Turin, Bari (with Brindisi, Taranto, Lecce and Matera), Ravenna (with Ferrara, Forlì and Rimini), Modena (with Parma and Reggio), Florence (with Pistoia and Prato), Genoa (with Savona), Naples, Leghorn (with Pisa, Lucca and Grosseto), Bologna, Verona (with Trento), Palermo, Ancona (with Macerata), Pescara (with Chieti and Campobasso), Perugia (with Terni), Messina (with Reggio Calabria), Trieste (with Gorizia), Catania, Brescia. Peripherical smaller persistent groups are Cagliari and Sassari in Sardinia; Imperia, Aosta, Cuneo, Sondrio, Bolzano, Belluno and Udine around the Alps; Pesaro, Ascoli Piceno and Foggia along the Adriatic coast; Cosenza and Catanzaro in Calabria; Ragusa and Caltanisetta (with Agrigento) in the south of Sicily. Finally there are some small persistent groups in very insulated mountain areas. At first sight it is striking that the main cities have very small groups, while many intermediate cities are glued together in very extended

groups (of course they happen to be very loosely and sparse). There is a strong implosive capability of the metropolis, and it depends on the fact that many of the nearby boroughs have become subsidiary attractors for the whole metropolitan area.

Intermediate cities do not succeed in this performance, so it is more likely that at least one of the flows coming out from the surrounding boroughs is directed outwards. This phenomenon arises of course provided there are intermediate attractors sparse in the territory, otherwise groups become again very compact, as it happens near the mountains or near the coasts. The implosive capability of main cities is justified also from economic considerations, since it is much more expensive to live in the city or in its immediate neighbourhood, and it is not justified if a person works outside, where houses cost less. A similar phenomenon has been detected when studying the boundaries of groups that are near to a big city, but are centered on some smaller town: actually the small town is not at the center of the group, but on its extremity on the side of the main city, even if some municipalities in between may lie in the dependence area of the small town; perhaps this means that a person that works in a place in between, prefers to live in some small place nearer the big attractor rather then in the secondary town. This phenomenon is particularly noticeable for the groups of Modena (main attractor Bologna) and of Arezzo (main attractor Florence).

9.7.3 Sparse groups and fuzziness

The greatest transient groups, in particular Novara (with Vercelli and Biella) and Cremona (with Mantua) are very sparse, while on the contrary when transient groups depend on strong attractors, or on multiple attractors, they tend to become rather small and compact. Examples are found above all near Milan (e.g. Como, Varese, Lecco, Bergamo, Pavia, Lodi) and Rome (e.g. Viterbo, Rieti, Frosinone). Going down towards the lowest level of significance we find a lot of binary groups formed by two small municipalities. The total number of groups at the level three is 936, but actually most of them are binary groups or trivial transient groups. Even without thresholding, most of them vanish when we compare them with the analysis at the level of two flows.

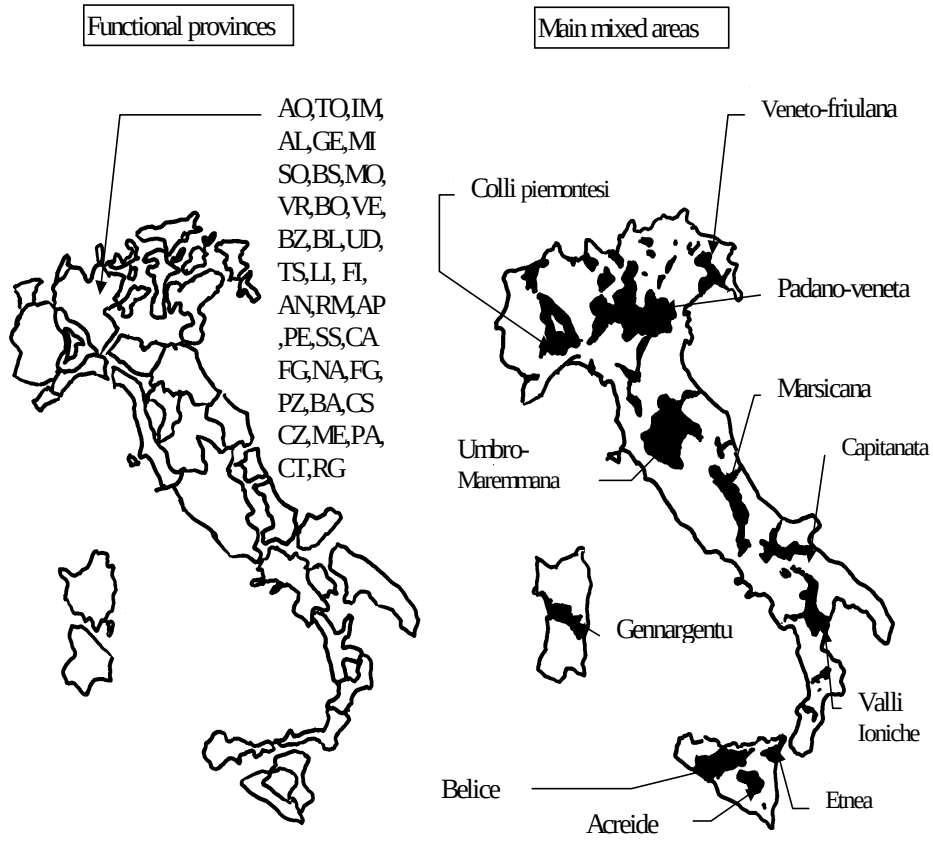


Figure 9.5 Main functional provinces and mixed areas in three flows analysis

It is to be expected that between two functional provinces there exist always a narrow grey area of mixed influence. What become relevant is when this area is very extended. Fig. 5 shows also the most important areas of mixed influence, that actually correspond to agricultural areas with loss of polarisation. Remark that on the highest mountains mixed areas do not arise because of sharp horographical divisions, while on lower hills they can be found, just like in the countryside.

9.7.4 A comparison with two-flows groups

The main result of the comparison between the two levels is the different behaviour of unipolar groups in comparison with multipolar groups. All groups of level three tend to lose elements, some of which join together in small transient groups at the level two, but while unipolar groups remain essentially unchanged, multipolar groups are segmented into a plurality of main groups centered around the poles, and obviously some of them may be

transient groups. Only the case of really twin cities is preserved at this level. Segmentation is particularly evident in rural areas, where at level three, in accordance with Central Places Theory (Christaller, 1993), groups appear to be rather erratic, with random connections, while at the level two practically every big village could be the center of a small transient group.

In rural areas conflicting with metropolitan areas, on the contrary, transient groups are less common, because the two flows move far outwards, the first to the metropolis, the second to the head of the province. In particular this explains the different behaviour that we find in Lombardy and in Veneto. Remark also that in Veneto there is a wide spreadout of small industries almost all around the upper plane up to the first hills. This is also the reason for the arising of a huge group at level three, that splits into 24 (!) groups at level 2, four of which are persistent (Venice with Padua and Treviso, Vicenza, Pordenone, Bassano del Grappa). Venice is the only group of level two that remains multipolar, even if the two really twin cities are Venice and Padua, but not Treviso, that all the same still belongs to the group.

Many big transient groups of level three have in their interior one or more persistent groups at the level two; in some other case, like Cremona, where the level three group has multiple external attractors, the splitting procedure forms groups with only one external attractor. Thus the comparison between the two different levels gives also information about the degree of 'grey' areas of multiple attraction.

Level two is the most suitable for the study of functional provinces, since they tend to correspond somehow to the administrative provinces, with the main exceptions of the huge functional provinces of Milan, Rome and Naples. As we have just said intermediate areas are considerably reduced, so that we almost get a partition of the whole territory. At level three functional provinces tend rather to indicate the main subdivisions of a region, but near metropolitan areas they show a particular stability, essentially coinciding with the corresponding provinces at the level two. In this last case also the relative functional domains of transient groups deserve to be studied, while transient groups outside metropolitan areas usually give interesting information only in view of studies of regional geography, but are of limited use in a national overview.

We end this general section with some further remarks about the North Eastern regions. For what sparse groups are concerned we can find a superposition of effects (rurality plus spread out of small industries) in the case of Veneto, where this situation is highly relevant. Another area where the situation arises lies on the southern side of 'via Emilia', between Parma and Bologna. In both cases a lot of small industries favourably grows in a formerly rural area.

As for chains there is obviously plenty of radial chains, and it is not worth to enter into details. On the contrary we choose to recall two of the most striking cases of transversal chains. They can be found in Veneto and are the South and West neighbourhood of Verona and the North and West neighbourhood of Padua. The presence of transversal chains seems to imply that in that sector there exists a functional limit to the expansion of the attractor, since it rather tends to exhaust all the resources in its neighbourhood before expanding further.

9.8 The role of satellites in peri-urban areas

In view of peri-urban analysis it seems that satellites should play an essential role, because they may indicate the presence of a comparatively natural area even in the neighbourhood of great cities. We have classified satellites both according two-flows analysis and three-flows analysis, but this latter is less meaningful. Also we did accept as satellites only those belonging to the first degree (absolute), the second and the third, since higher degrees, apart being very unlikely, reflect already an high level hierarchical position. We classified them according to the second level analysis, considering their number, the number of inhabitants, the weighted mean of self containment of workers, the total surface and the mean population.

Table 9.1 The role of satellites in peri-urban areas

Type	Number	Population in millions	Self Cont.	Surface	Density
Non Sat.	2021	36,888	79.5%	112,894	326.74
deg.3	282	2,016	68.2%	13,967	144.34
deg.2	1026	5,383	62.1%	43,198	124.61
deg.1(Abs)	4772	13,042	52.0%	130,985	99.57

Of course at level three there is a reduction, namely absolute satellites reduce to 3,448, second degree to 837, third degree to 260. So it happens that in Italy there is a high number of absolute satellites, where a lot of people lives (almost 25% of the population), disposing of almost 45% of the territory. It was to be expected that the density of population decreases as we descend towards the lowest degrees, but this is not a rule. Actually many boroughs near Milan are satellites and have a high density (over 1,000 inhabitants/km^2). The index for self containedness of work also decreases descending the scale, what is consistent with the fact that usually satellites offer less varied professional opportunities, or even few possibilities at all. There are only two towns head of province that belong to the class of satellites (at level two, not at level three), namely Gorizia and Lodi, while on the contrary all the main cities not only belong to persistent groups, but also have a self-containedness index higher than 90%, with the only exception of Florence. Remark that also a couple of twin cities like Venice and Padua have an index above 90%.

Usually many mountain boroughs are satellites, with the exception of the main winter sport resorts. In the country usually absolute satellites obey to Christaller's theory of Central Places, but, unlike what the theory could suggest, second and especially third level attractors very often belong to groups, what usually means that also in rural districts a preminent position can be preserved only with the aid of some form of manufacture that can attract people from a wider region than the strict influence neighbourhood foreseen by the theory. Here anyhow there can be some form of statistical illusion, because usually the

number of municipalities is comparatively smaller than in Lombardy, Piedmont and Veneto.

9.8.1 Satellites in peri-urban areas

Up to this point we have essentially confirmed what could be expected, but what happens in a metropolitan area? Some municipalities just go back into the role of residential towns, of high or low level, and are surrounded by other towns that are not pure satellites. But a territorial strip of satellites (of first or second degree) begins to be interesting for the urban-rural interrelation. In order not to overestimate this potential role we took into account also the density of population, considering tentatively the threshold of 1,000 inhabitants for square km. Plotting the results we found actually a good fitting with some regional parks of relevant extension in the northern side of Milan metropolitan area, namely, from West eastwards, Parco del Ticino, Parco della Pineta di Appiano Gentile e Tradate, Parco delle Groane (the nearest to the city), Parco della Valle del Lambro, Parco dell'Adda Nord. The analysis performed in (Cannata, 1998) on the contrary does not evidentiate any of the last four parks, and performs poorly also in detecting the largest of them, namely Parco del Ticino. Of course both methods succeed in detecting the southern agricultural area.

The comparison is presented in fig. 7 and fig. 8, in which the five parks are shaded. Our two indicators (satellitar structure and density of population) seem to perform better than a set of more than fifteen social-economical indexes near the cities, even if they seem to be less effective in distinguishing different levels of underdevelopment on the mountains. The reason can perhaps be found in the fact that social indicators near a big city tend to assume values that are very similar between themselves in comparison with other parts of Italy. Remind in fact that all indicators were worked out with the same technique for the whole nation. Also our techniques are the same through the whole Italy, but they are in a certain way self-adaptive, inasmuch locally some form of hierarchy necessarily emerges, since we consider only the most relevant selection of flows for each municipality. Nature seems not to be an absolute value, but it is rather a comparative good. Where there is little nature preserved, even that little amount acquires a great value, and deserves protection and respect, much above what the value of absolute indicators could suggest.

9.9 Some final remarks

The availability of a great amount of data about daily commutation adds an important relational information to purely areal data. It allows to perform some sharper analysis of the urban-rural interrelations, both on the large regional scale and the small peri-urban scale.

Cell mapping, transferred for the first time from physics to territorial analysis is a method that helps us to deal with the large data set. Of course the application of the method requires new computational tools, and the interpretation of the results can still lead to some difficulties, that should be overcome creating a set of archetype models of reference. Many of these models fortunately already exist in the original version of Cell mapping and just

require some reinterpretation. Some new archetypes have been created, and some still need to be formalised, even if they have been experimentally detected.

The main idea of cell mapping lies in selecting and simplifying data from the very beginning, instead of simplifying them at the end. This choice not only leads to computational simplifications, but often allows a deeper understanding of the underlying structures of the phenomena to be investigated. The enrichment of the analysis, obtained reducing the simplifications, becomes easier in view of the results obtained at the lower level steps. We must strike the fundamental point, namely that 'most meaningful data' means 'relatively most meaningful', not 'absolutely most meaningful', even if some thresholds could be imposed. This choice allows an automatic scaling of meaning that is no longer subject to the opinion of the researcher, allowing to use a same methodology that proves to be adequate and conceptually uniform over a wide range of different territories with different socio-economic and ecological conditions, automatically adapting its sensitivity to local conditions.

Cell mapping approach in its capability of synthesis, adaptation and non-arbitrary simplifying, together with georeferentiation of results seems furthermore fundamental and preliminary for a richer analysis in which quantitative data should prevail with respect to boolean data. The authors intend to follow now this line of research. A further development is allowed by the available commutation data, since they are divided by public and private transportation capability. The differences between the results should bring into good evidence the distinction between consolidated and emerging territorial interrelations, thus giving a direct forecast capability to these methodologies.

The mathematician knows all too well that interpolation is far more accurate than extrapolation. In the case of evolution systems it is by far easier to understand what has happened between two well known states, rather than to predict what will happen in the future, even if we know a lot about the present and the past. Therefore the reader should take our results as one component of a forecast system, and compare it with other methods. To our support we have mathematics, that establishes that non linear dynamic systems (i.e. almost all systems that rule the world) have bifurcation points, where very small changes in control can lead to entirely different evolutions (compare the wonderful work of Thom, 1972).

The knowledge of critical points of a complex system could be very useful to the policy-maker, both to establish a scale of priorities and to point out when deeper analysis is required before taking decisions. Unfortunately what is relatively easy to investigate when all the rules of the game are known (like in physical models) leads to more uncertain results when applied to sciences where human behaviour is involved. In particular models of areal analysis seem to detect some possible critical decision points, but there is usually no proof that all of them have been detected. The comparison between the results of different methods of analysis can avoid the loss of important information's, and in particular those areas where different methods lead to substantially different results should be investigated and understood in more detail. As it was shown in the example of Milan, peri-urban areas, and more generally areas of urban-rural competition, are highlighted in these comparisons. Since our method is founded upon techniques different from other models, we think that it can give a contribution to understand the position of these strategic points of evolution, so that it could help the decision maker to choose between a natural

expansion of a consolidated structure and a controlled new line of evolution that takes into account emerging new tendencies. We hope therefore that our efforts may be of some practical use going beyond scientist's intellectual pleasure.

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10. The use of Multi-Agents and Cellular Automata for modelling a changing countryside

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Abstract

This paper presents the merits of a model structure able to translate individual stakeholder (actor) behaviour into global spatial results. The need for such a model becomes clear when looking at some of the current developments in countryside [1]. The field of distributed artificial intelligence is said to offer interesting techniques able to model dynamic and complex systems such as land use. To illustrate this we discuss a possible direction of development based upon a combined use of Cellular Automata and Multi-Agents. Using these techniques, models that are able to model the global effects of individual behaviour are insight. CA offers an promising techniques to translate individual spatial interactions towards a global result while MAS adds a technique for modelling individual behaviour of actors in their attempt to realise their spatial objectives.

10.1 Introduction

The identity of the countryside is subject of continuous change in many countries in Western Europe. This induces a need for constant reconsideration after the functions the countryside needs to fulfil. Therefore considering the countryside as a space solely to produce agricultural products is obsolete. Urbanisation and loss of high valued cultural and/or natural areas are just one of the problems accompanying a search for a new identity of the countryside. Land use planning (LUP) therefore becomes more and more complex. Increasingly a need for methods able to support interactive land use planning is felt i.e. planning supported by intelligent tools, which give insight into the planner into the spatial effects of his ideas. Sometimes this process is described by using the term 'artificial planning' 'artificial planning experience' (Portugali and Benenson (1995).

Research after interactive land use planning currently carried out by LEI-DLO includes for example the SimRuralis project and the Land-use scanner. The first is a network 'game' in which real-life actors (and in the future probably computer actors) are trying to fulfil their spatial objectives. They can for example sell or buy land. Computer agents are doing the banking, bookkeeping and are checking the legal procedures, while small process models are controlling the environment i.e. taking care of the natural processing. The focus of this model is to support co-operative decision making in LUP. The land-use scanner is a spatial allocation model to simulate possible, future land use. The allocation is based, among other things, upon the effects of economic growth, demographic

[1] The idea for this paper is partly based upon a research proposal written for the Netherlands Organisation for Scientific Research (NOW) (Bregt et al., 1998).

changes and environmental planning. The model engine is based upon an economic equilibrium model ((Rijswijk et al., 1998, Schotten et al., 1997).

The two research examples mentioned above both do not implement knowledge of individual stakeholder behaviour: SimRuralis deals with decisions made by the involved stakeholders implicitly. Knowledge about actor behaviour is not used yet. Although a very useful tool for education or training it does not really increased knowledge about behavioural aspect of stakeholders. The Land-Use Scanner is based upon a generalised idea the objective stakeholders try to fulfil. The model is an implicit mathematical description of the lumped behaviour of the stakeholders.

As we will discuss further in the ongoing, a more cognitive/behaviour-based approach on modelling land use is desirable to develop models supporting *interactive land use planning*. Therefore this paper presents a start of a relative new approach in modelling land use change. Based upon an individual-based modelling of actors (stakeholders). It is a first result of a joint research after interactive planning done at LEI and Wageningen Agricultural University.

We focus upon the characteristics of land-use related to this individual modelling approach. Therefore we first describe briefly land use and land use change as a complex system. Second we try to identify the requirements of a model capable to describe such a complex system. Third we illustrate the feasibility of the postulated ideas by combining two methods out of the field of the ' artificial intelligence: Cellular Automata and Multi-Agent Simulation.

We do not have the aim in this paper to present you a compressive framework for modelling but rather to carefully introduce new concepts which are truly promising but also need a lot of work and discussion.

10.2 System characteristics of land use

An often used definition of land use planning (LUP) is: 'the search for and the implementation of the most appropriate mutual adaptation of space and society such in favour of this society' (Veen et al., 1971). This definition implies that LUP is not a straightforward process but one having many unclear and uncertain factors involved. In this respect Kleefmann (1984) sees planning as *a process of a search for direction*. Keeping this definition in the back of our head we start drawing our 'picture' of a land use system (LUS). Figure 10.1 shows a decomposition of a hypothetical LUS representative for the Netherlands. By no means, it is intended to provide a comprehensive description of such a LUS, but it provides an idea of the general components it is composed of. Starting at the top, the spatial organisation can be subdivided into the society interacting with the physical environment and vice versa. At a lower level, we recognise the, what we will call here, low-level components. For the physical environment component, we extract a biotic, spatial-visual and an a-biotic component. Within the social-environment component a policy, economy and society component can be distinguished. All the components are interacting and continuously exchanging 'data' in their efforts to bring the system into equilibrium.

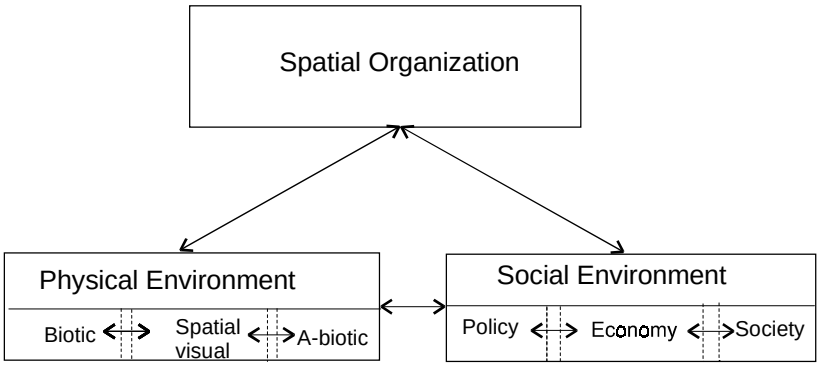

Figure 10.1 Components of a LUS

Last decades we have seen that interactions between the components became increasingly complex. If we briefly (and not completely) explore the main factors contributing we see:

- A shift from *single-towards multiple land use*. The scarce (economic) available space in rural areas is being competed for by many interest groups. The result is that areas have to meet several objectives. For example, traditionally agricultural areas are transformed into areas, which also need to meet recreational objectives as well as provide high cultural values and high natural amenity values.
- Governmental decentralisation. More and more decisions are taken at a regional or local policy level. As a result land use planning becomes less unequivocal. Resolving conflicting interests requires more and more time and intensified communication between stakeholders.
- A shift from *single-stakeholder* towards multi-stakeholder planning. On account of the multiple land use planning and the decentralisation process the number of stakeholders involved in the planning process increases. Competition between stakeholders increasingly burdens the planning process.
- Technical developments raised, to a large extent, the physical constraints of our environment. We are able to realise our needs for infrastructure and urban expansion virtual everywhere (technically even below the surface).
- International markets and international politics increasingly introduce factors into the system not to be influenced at national level. More and more supra-national forces and -stakeholders exert influence on the LUP. International economics increasingly influences LUP policy. An example is the construction of the 'Betuwe line', a railroad exclusively for freight transport needed to maintain and develop the position of the Netherlands being the 'Gateway to Europe'.
- The planning strategy is increasingly involved in the linking of short-term objectives with long-term perspectives. The starting point for this is a search process in which communication and research are closely connected (Geertman, 1996).

The consequence of the above stated is that LUP in the context of determining future land uses is a continuous, complex non-autonomous and non-linear process happening at

different scales. Land use systems therefore can be regarded as *complex systems* (Couclelis, 1988, Itami, 1994). This implies that effects of decisions made during the planning process are very difficult to predict. Building models for this type of complex systems burdens us with problems, that conventional techniques (differential equations, statistical techniques, interaction models etceteras) only offer a partial solution for. They are often restricted by a number of factors such as for example:

- They are developed from a macroscopic point of view, ignoring the fact that the majority of land use changes are caused by the way involved actors interpret and process information and anticipate the possible actions or reactions of others (Phipps and Langlois, 1995 after Huston et al., 1988).
- Land use processes take place at various levels in time and space. Causal relations existing at one level do not necessary occur at other levels. Methodologies designed to support land use planning must be able to cope with this problem, often denoted in the literature as, scale effects (Veldkamp and Fresco, 1995).
- Existing methodology ignore the fact that decision making largely depends on the distribution of information and the way stakeholders interpret and anticipate on this information.
- Conventional methods are based upon a computational reducibility of a system. However in complex land use systems this reducibility may be well exceptional than the rule (Itami, 1994 after Wolfram, 1984).

10.3 Tool requirements

Recalling the definition of Veen et al. (1971) and Kleefman planning is to be seen as scenario planning i.e. aimed at exploring the future. A definition of scenario-planning is 'a description of the present state, of one or more possible and/or desirable future states, and a description of the way leading from that present to the future states' (after Hidding, 1997). Scenario planning therefore involves mainly 'playing' with the question 'what would happen if…..'. The degree of freedom present during scenario planning is large. Especially when the planning is done in the context of fundamental explorative research aimed on policymaking (Kleefman, free after Hofstede, 1970).

If we combine the above mentioned with the characteristics of the system we are able to formulate requirements of tools applicable for interactive scenario studies. These requirements must be regarded additional to general requirements of tools for this type of applications (see for example Ayeni, 1997):

- model the behaviour of stakeholders at an individual level;
- provide insight into interactions between stakeholders;
- enable the researcher/planner to play with the individual components;
- translate the resulting effects into changes in the spatial configuration.

We visualised it in figure 10.2. The LUS representation of figure 10.1 is extended towards a structure that better meets our demands according the above stated requirements.

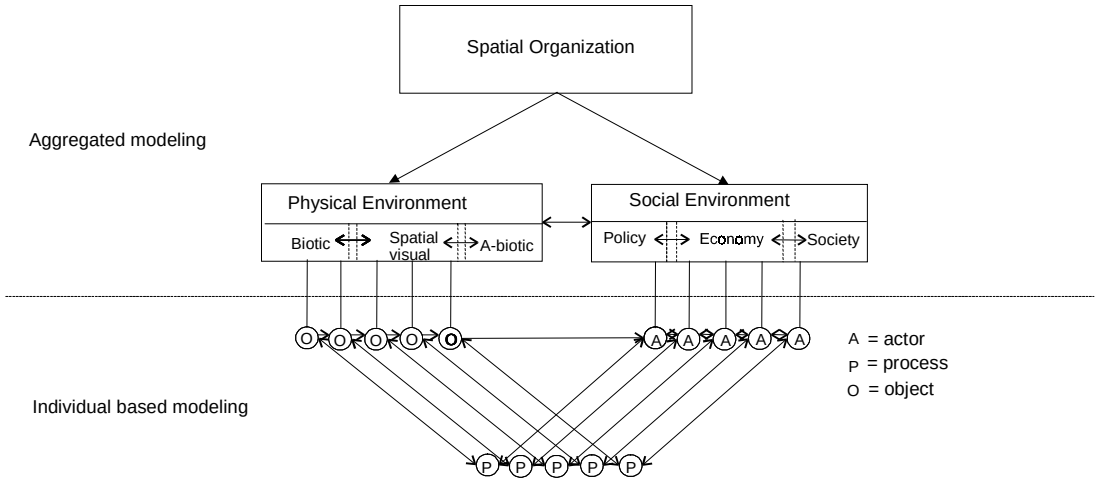

Figure 10.2 Individual components of the LUS

The aggregated components of the physical and social environment are instantiated based upon the low-level components of the LUS. This results into individual objects (below the line). In this case the objects can been seen as the building blocks of the social/physical environment. Individual actors (A) residing in the low-level components of the Social-Environment interact with the spatial objects (O) present in the Physical Environment through what we call here processes. The term processes in this respect is used as the household word for the methods used by A to translate intentions of A to changes of O. Knowing what we want triggers our next question: 'which method or methods facilitate such an approach'? Interesting methods that possible meet our ideas of modelling can be found in the field of distributed artificial intelligence. Promising tools for modelling LUS include especially Cellular Automata (CA) and Multi-Agent Simulations (MAS).

10.4 Cellular Automata

Cellular Automata (CA) (in respect to a spatial context) can be defined as: 'a cellular (or cell) based space model consisting of an infinite two-dimensional array of regular polygons (cells), each of which is, at any time, in a state determined by the states of a set neighbour cells according to some uniform location-independent rules' (Couclelis, 1984). From this we can read that the basic properties are:

- A regular n-dimensional lattice. Each cell of this lattice has a discrete state;
- A neighbourhood (typical a (extended) Moore or Von Neumann neighbourhood);
- Local rules describing the dynamic behaviour of the system. The state of a cell at time t + 1 depends on the states of the cells in the neighbourhood of the cell and the cell itself at time t. These rules may be deterministic or stochastic.

This means that:

- The automaton is discrete in space and in time;
- infinite;
- autonomous, i.e. no external input is allowed.

Dynamics are brought into the system by parallel evaluation of the cells. The ability to generate complex global spatial dynamics out of relative simple local rules is generally seen as one of the most important and interesting properties of CA (Couclelis, 1997, Phipps and Langlois, 1997). Also, the explicit and formal treatment of the temporal dimension by CA is advantageous to spatial modelling (Wagner, 1997).

John Von Neuman introduced the CA technique in the late 1940s. During the late 1960s, Conway proved its applicability by designing the 'Game of Life' the first operational CA computer program. The 'Game of Life' is a very simple model of artificial life consisting out of four simple rules:

- a living cell at t with only 0 or 1 living neighbours dies from isolation at t + 1;
- a living cell with 4 or more living neighbours dies form overcrowding;
- a dead cell with exactly 3 living neighbours becomes alive;
- all other cells remain unchanged.

These rules are applied to all the cells simultaneously. Each time the whole grid is recalculated it is called a generation. As the program runs through multiple generations the grid can be see to be moving in strange, non-random way. From any mildly complex starting point different behavioural patterns will emerge. Other patterns are unstable and die or are emerging.

This program made researchers in the field of geography ask themselves the question whether it could be used to model complex spatial systems (see for example Itami, 1994). Since the early eighties, when the computational power of the computer grew, research has been carried out after the application of CA for these purposes. Many of these studies focussed upon urban systems (see for example White et al. (1993), Portugali and Bennenson (1995), Batty and Xie (1994), Xie and Batty (1997), Portugali et al. (1997), Couclelis (1997) or relative autonomous system such as Islands or isolated areas (White et al., 1994).

However wanting to implement CA techniques to describe complex systems with continue changing behaviour and characteristics (note that LUS are such systems) we encounter some restricting factors. We mention (after Couclelis, 1997):

- The implicit nature of CA does not allow for external influences i.e. exogenous input into the system;
- The size of the neighbourhood ought to be stationary throughout space and time;
- The use rules need to be uniform throughout space and time.

The above stated seriously hampers the usability for LUP purposes. We noted before that:

- Interaction between actors and land use continuously changes and is scale dependent. Therefor a flexible adaptation of the local rules and neighbourhood seems to be required.
- There is an increasing influence of processes from outside the system requiring exogenous input into the model.

The use of CA therefore seems to be restricted to the study of relative autonomous spatial systems, which develop in a strict projective way (apart from using stochastic

rules). Examples of studies of such autonomous systems are urban growth models for instance the models of Batty et al. (1994) describing the growth of cities in the US, the model developed to simulate the development of Cincinnati (White et al., 1993).

However relaxing the definition of CA towards a structure with a more open approach will bring some nuance into this. It is not in the scope of this paper to describe the process of relaxation but Couclelis (1985) did some sound research after this. She relaxed the original principle of CA using the DEVS formalism of Zeigler (1979). This resulted into a of CA allowing for external input (structured non-autonomous machine).

The non-autonomous cellular automata allow external input to influence the automaton. (Couclelis, 1985). Theoretically, these external input segments can be delivered by other, asynchronous of synchronous running CA or input of external (non CA) deterministic, statistic or expert models. White et al. (1993) developed a modelling framework allowing the implementation of different type of mathematical representations the so-called constrained Cellular Automata Approach.

Examples are 'Island Model'(White and Engelen, 1997), 'RAMCO' (or the 'Leefomgevingsverkenner' a dynamic model of society to explore the effects of various policy upon the quality of the physical environment, not documented yet). This approach uses external models to calculate at a macro level, natural, economic and demographic development, resulting into spatial claims to be expected at the next time-period. Next, a CA scheme deals with the actual allocation of spatial functions (the micro Level). The effects spatial functions have upon each other are represented by so-called distance functions, based upon expert knowledge.

Another example is the SimLand model of Wu (1998) integrating a multi-criteria evaluation method, CA and GIS. The MCE concept is used to determine preferences in land development decision making where CA drives the temporal evolution.

10.5 Multi-Agents

All the examples of models mentioned above use external models to update the rules of CA. One of the main disadvantages of implementing CA in such a way is the undermining of CA, being an elegant way of individual based modelling. The original strength of the concept is partly lost by just plugging-in the 'old type' of spatial models into CA. The original idea behind using CA i.e. modelling the dynamic interactions of the system components at an individual level becomes fuzzy. In our opinion, other concepts are available more in line with the characteristics of our complex modelling problem.

Multi-Agent Simulation (MAS) is such a concept. Multi-Agents are conceptual entities (agents) who influence in a reactive or proactive manner themselves and their environment (Sanders, 1997). Maes, 1997, stated that agents can been seen as a 'system that tries to fulfil a set of goals in a complex dynamic environment. An agent is situated in the environment: it can sense the environment through its sensors and act upon the environment using its actuators'. One of the most interesting features of MAS is its ability to model individual non-linear behaviour and maintaining an autonomous interaction with the world (Jonker et al., 1997). MAS was developed in its operational form during the

1980s as part of behaviour-based artificial intelligence studies. From the above stated we can summarise that Multi-Agents:

- Are adaptive;
- Have own goals to fulfil;
- Have a notion of their environment and are able to react upon it.

Currently some research after the use of Multi-Agents in recreational studies is carried out by for example (Deadman et al., 1994, Gimblet et al., 1994 and Gimblet et al., 1996). Most use of Multi-agents are found in industrial environments where it's used to manage complex distributed processes.

10.6 Combining cellular automata and multi-agents

Multi-agents are not per se spatial oriented. Integration with CA therefore may lead to a more solid concept, offering the necessary features to develop toward a tool for modelling complex LUS'. Figure 10.3 makes this clear. Shown is a magnification of the interaction of the instances of the low-level components. The figure highlights the interactions between agent's (A), processes and spatial objects.

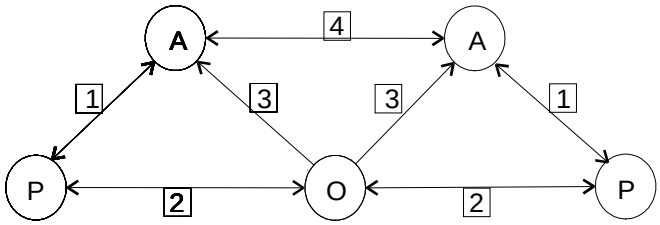

Figure 10.3 Interaction between individual components

We can distinct four possible ways of interaction:

- Interaction between A and P (route 1) i.e. the translation of objectives into decision making;
- Interaction between P and O (route 2) i.e. the translation of decisions into concrete actions resulting into a change of O;
- Interaction between O and A (route 3) i.e. assessment of the effects of the actions which is actually an evaluation of the gab existing between desired situation and the real-world situation;
- Interaction between A and A (route 4) i.e. monitoring and reacting upon other A low-level components as a result of changes in O.

Note that physical processes i.e. direct interactions between O are not in the scheme. However, they are present in the real world and will be represented in P as fixed rules. Also existing hierarchical relation between for example actors are not yet defined. Route 1, 2 and 3 can been seen as a model of intentional activity (figure 10.4) as described by for example Diepenmaat (1997). Considering A trying to realise/optimise a certain spatial

objective we see that route 1 and 3 depends upon the way A interprets O and the decisions made by A in order to change O. Relations between A and P are therefor not constant in time and place.

Hence, P needs to be updated each time O changed or the objectives of A change. In terms of CA this means a redefining of the neighbourhood and local rules being instances of P and the cells and states being instances of O. P will be updated by A through external input causing a change in rules and/or neighbourhood as. As a result of the actions of agent A other A agents may acknowledge a situation of concern a initiate a new problem solving sequence. This is a continuing process until perhaps the unlikely occurrence of some kind of equilibrium.

Generic model of intentional activity (source: Diepenmaat 1997)	Interaction type	Method
Stage 1: acknowledge situation of concern	Route 4 and 3	MAS
Stage 2: construct perspective	Route 1	MAS
Stage 3: implement script	Route 2	CA
Stage 4: evaluate situation 'to be'	Route 3	MAS

Figure 10.4 Relation between spatial problem solving, types of interactions and the method

Combining CA and MAS thus appears to be promising for actor-based modelling of land use. We mention the following innovative features:

- Change in the spatial organisation is based upon the awareness that it is mainly the result of the behaviour of and the interactions between individual stakeholders;
- The gap between the existing spatial information and a dynamic description of actor behaviour can be bridged;
- Integration of CA and MAS facilitates the coupling of actor behaviour, rules of planning, political intentions, and their physical effects upon the spatial configuration;
- The relative closure of CA, hampering the modelling of complex systems, is solved elegantly by integrating it with the MAS paradigm. Vice verse the problems multi-agents have in altering a complex space is overcome by the powerful computational strength of CA;
- The individual based approach allows researchers and planner to monitor the actors' goals, to what extend they are able to realise them and the influence it has upon the environment and other actors.

10.7 Ongoing research

Although the concept is quit robust there are a lot of (and even fundamental) questions that need to be solved before we can really implement the CA/MAS combination in a spatial planning model that is robust effective and adaptive (Maes, 1998). Not answered are for example questions like:

- how can an agent learn from experience;

- how can an agent decide between various options, opportunities, threats and contingencies that may arise in time;
- what kind of (spatial) data is needed and how must it be organised in order to provide information for agents;
- what information is needed in order to create realistic agents;
- how can we interface CA with the MAS and integrate it in current GIS';
- how do we translate agent behaviour to local CA rules (route 1)?

At Wageningen University and LEI-DLO last year a joined research project is started after the use of CA and MAS in land use planning. Main goal of the research is to amass knowledge and develop tools that support interactive land-use planning and scenario studies. Interest is in finding methods to gain insight into the behaviour of actors and map the 'forces' acting upon the countryside.

The research is expected to be supportive for, and integrated with various ongoing projects such as for example the Land use scanner, an easy to use model for scenario studies (Rijswijk et al., 1998, Schotten et al., 1997) or SimRuralis a network game to support interactive decision making in countryside planning.

10.8 Conclusions

The continuously changing identity of the countryside possibly needs a reconsideration of the thinking about models supporting planning. To understand and control something of the complexity underlying the changes in de spatial organisation of the countryside tools, supporting individual and behavioural based modelling level have interesting properties. Behavioural aspects of actors can be treated explicitly this way perhaps leading to the development of tools that better suits the need modern planning. Traditional methods do have difficulties in handling complex systems and individual modelling.

A promising route is found in combining Cellular Automata (CA) and Multi-Agents (MAS). The translation of actor behaviour, (modelled by using agents), towards global spatial dynamics (accounted for by CA) offer promising routes towards interactive land use models which are more inline with modern demands. The strength of CA in capturing spatial detail and spatial complexity provides features beyond the realm of traditional methods like for example the regional based modelling. Its perhaps to early to judge the full extend MAS and CA can support researchers and planners in their understanding of the complexity of LUP. For that still a lot of work needs to be done. But we have argued that these techniques do have the potential of giving insight in the forces and interactions playing in a changing countryside.

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11. Nature conservation in agricultural areas: contracts between government and farmers

N.B.P. Polman and L.H.G. Slangen

Abstract

The interest in the rural areas in the Netherlands shifted away from creating an optimal environment for agricultural production to a policy where nature and landscape preservation also play an important role. The contribution of this paper will be the discussion of the existing nature conservation contracts in agriculture from a transaction cost point of view.

In a real economy, a loose mix of systems is used to co-ordinate and manage various kinds of activities. The kind of co-ordination that is most effective depends on the nature of the case. In New Institutional Economics, as elsewhere in mainstream economics, the preferences of agents are taken as given. But now, in addition to agents adjusting their behaviour to prices (as in neo-classical theory), they also do so in relation to the overall 'incentive structure' of society, which consists of formal and informal rules.

This paper focuses on governance structures in which farmers are involved. Most of the structures concerning nature conservation are hybrid forms. In these hybrid forms there is a role for both price as well as hierarchical adaptations. Partly due to asset specificity classical contracts are often not possible, although some contract types contain classical elements. Important aspects are time specificity and site specificity.

11.1 Introduction

In the past, nature conservation and landscape preservation in agricultural areas depended largely on farmers; there was almost no interference of the government or private organisations. In the last two decades, this changed rapidly in the Netherlands. The public interest in the rural areas shifted away from creating an optimal environment for agricultural production to a policy where nature and landscape preservation also played an important role. Landscapes provide not only resources for human consumption and recreation but also important habitats for wild animals and plants.

The primary target of nature management is the preservation of biological diversity. But, biological diversity is difficult, perhaps even impossible to quantify. Yet, one can make judgements about the likely potential of certain areas to have greater or lesser biodiversity than others (Van Kooten and Bulte, 1998:257). Policies could be addressed globally, to areas with a great deal of biodiversity (e.g. tropical forests), or one could develop policies that aim to preserve representative ecosystems in each country or locality. Preserving representative ecosystems in each political jurisdiction often results in inefficient allocation of global resources (Van Kooten and Bulte, 1998:257). Our starting point in this paper will be the current ecological situation in the Netherlands and we will

look for the organisation of nature production [1]. We are especially interested in the co-ordination mechanisms and contracts, used in the Netherlands, to produce nature.

After the introduction we will analyse in section 11.2 co-ordination mechanisms, both price and non-price mechanisms. The difference between market and non-market co-ordination failures plays a central role in the discussion of these mechanisms. Contracts and the contracting process are an important strand of modern institutional economics. In section 11.3 we will pay attention to contracts from a New Institutional Economics point of view. In section 11.4 and 11.5 we will apply the theory to existing contracts for nature production in the Netherlands. Section 11.6 contains a summary and conclusions.

11.2 Co-ordination; prices versus non-price co-ordination

The standard microeconomic theory focuses on the market as the mechanism to co-ordinate economic transactions. In the extreme case there are no firms or organisations apart from the market system itself. Individuals exercise foresight and choose between alternatives. The system assumes that everyone knows what the prices are and when goods can be bought and sold. The theory assumes further that the allocation of resources is dependent directly on the price system. Coase (1937:90) argues that an economist thinks of the economic system as being co-ordinated by the price mechanism. The economic system 'works by itself'.

We can identify a market equilibrium as an outcome of a market economy in which each agent in the economy (i.e. each consumer and firm) is doing as well as he can given the actions of the other agents. The first welfare theorem provides a set of conditions under which we can be assured that the market economy will achieve a Pareto optimal result. An economic outcome is Pareto optimal if it is impossible to make individuals better off without making any other individual worse off. The second theorem states that under the same set of assumptions, the first welfare theorem plus convexity conditions, all Pareto optimal outcomes can in principle be implemented through the market mechanism. That is, a public authority who wishes to implement a particular Pareto optimal outcome may always do so by appropriately redistributing wealth and 'letting the market work' (c.f. Mas-Colell et al., 1995:307-308). If the competitive equilibrium of the neo-classical model actually did provide a good and complete description of how markets work, there would be no need for other economic organisations aiming at improving economic efficiency, although political organisation might still exist in order to bring more equity into the system.

The price system achieves efficient allocation of resources without requiring communication among individual decision-makers of anything more than the summary information about the economy embodied in the prices. Furthermore the price system does not require any individual to do other things than what he or she deems to be in his or her own best interest (c.f. Milgrom and Roberts, 1992:89). Any inefficiency that arises in a market economy, and hence any role for Pareto-improving market intervention, must be traceable to a violation of some of the assumptions of the welfare theorems. In that case the

[1] Throughout the text we use 'nature production' as a synonym for preserving the quality of the soil, water and air, and wildlife and landscape.

market equilibria fail to be Pareto optimal and we have the case of market failures. The price mechanism that neo-classical economist expect to overcome these problems may be ineffective. Instead of speaking of market failures we could also speak of co-ordination problems. But also planning (in firms, organisations or countries) obviously serves a co-ordinating purpose, performing functions that could be co-ordinated instead through the pricing mechanism (Medema, 1996:572).

Where price, information and mobility characteristics of perfect markets depart significantly from those prevailing in actual markets, the outcome will not be efficient. Nonmarket failures concern the failures of governance structures other than markets. Both market failure and nonmarket failure can be viewed as resulting from the particular transaction cost characteristics and burdens associated with markets and organisations (which include governments) as alternative governance structures for organising economic activities (Wolf, 1993:7). In comparison to the study of market failure, the study of hierarchical failure is seriously underdeveloped (Williamson, 1996:17). Non-market failures include government failures as subject of the public choice theory (see for government failures: Slangen, 1996:181). The government is one of the non-market organisations, others are firms, universities, foundations, etcetera, with non-market failures. The behaviour and deficiencies of those organisations should be included in a comprehensive theory of non-market failure that can highlight similarities and differences among them, as well as permit suitable comparisons to be made between the non-market sector and the market sector (Wolf, 1993:6). The opposite extreme of the market mechanism would be a situation where the price system is eliminated by a system of explicit central planning (organisation). Economic organisations are created entities within and through which people interact to reach individual and collective economic goals.

The economic system consists of a network of people and organisations, with lower-level organisations linked together through higher level organisations. The highest-level organisation is the economy as a whole (Milgrom and Roberts, 1992:19). Private parties as well as governments can make arrangements to replace the simple price system when they are not satisfied with the results of this system. Formal organisations make at most limited use of prices to co-ordinate their activities (Milgrom and Roberts, 1992:89). Even in the existing market systems, there is extensive use of means of co-ordination besides prices. Governments, in particular, favour direct orders that specify particular actions to be taken. An example is the Dutch regulation concerning the emission of ammonia for pig sheds, which can be seen as a direct order. These direct orders specify the actions that farmers are obliged to take, in order to prevent the ammonia emission from their pig sheds.

Resource allocation is a problem of allocating a fixed set of resources among various possible uses. The term resource can be interpreted broadly enough to denote virtually every kind of important economic or business decision as a resource allocation problem (Milgrom and Roberts, 1992:92). Alternative mechanisms of co-ordination entail different levels and patterns of cost and therefore the allocation of resources is impacted. In addition to the planners' time and equipment, planning demands time from production people who must fill out forms, complete reports, and answer the planners' queries. At the end of the planning process, errors inevitably still occur, both because the prices or plans are based partly on guesses and partly on erroneous, incomplete or misleading information and because miscalculations and mistakes occur (see Milgrom and Roberts, 1992:90).

Understanding the importance of these costs of planning is thus central to understanding how and why co-ordination matters (c.f. Medema, 1996:573).

11.3 Co-ordination from a New Institutional Economics point of view

According to Williamson (1998:24) New Institutional Economics (NIE) comes in two parts. Part one deals with the institutional environment - the rules of the game - and part two deals with the institutions of governance - the play of the game. One of the salient differences between the institutional environment and the institutions of governance are that the former mainly defines the environment of the latter (Williamson, 1996:5). According to Ménard (1995:175) a governance structure is a way to implement and operationalize the 'rules of the game' as they are defined by the institutional environment. Several studies have shown that the institutional environment matters for the making of contractual arrangements (e.g. the regime of property rights); for the implementation of contracts (e.g. the role of the judiciary); and rewarding or penalising of partners (e.g., the political feasibility of these arrangements) (c.f. Ménard, 1997:2).

A difference between the environment and the institutions of governance is that the level of analysis is very different. The institutions of governance operate at the level of individual transactions whereas the institutional environment is more concerned with composed levels of activity. Another difference is that the two operate differently with respect to intentionally. Spontaneous governance can be addressed as the 'invisible hand' introduced by Adam Smith according to which each businessman 'by pursuing his own interest … frequently promotes that of society more than when he really intends to promote it' (Smith, 1992:423, cited in Williamson, 1996:145). Markets can be seen as spontaneous mechanisms, whereas organisational mechanisms are often intentional. Generally, the study of governance is concerned with the identification, explication and mitigation of all forms of contractual hazards (Williamson, 1996:5). Among the hazards with which transaction cost economics is concerned and hazards of bilateral dependency; hazards that accrue to weak property rights; measurement hazards (especially in conjunction with multiple tasks) and/or oversearching; interteporal hazards; and hazards that accrue to weaknesses in the institutional environment (cf. Williamson, 1996:14). Governance is the means by which order is accomplished in a relation in which a potential conflict threatens to undo or upset opportunities to realise mutual gains (Williamson, 1996:12; Williamson, 1998:37).

A problem is that not everybody addresses the same meaning to the concepts of the governance structures markets and organisations. Ménard (1995:168) states that it is paradoxical how variously and vaguely defined the concept of market is. It has long been approximated as the abstract space of exchange in which frequent intercourse among buyers and sellers determines prices. Differently, Jevons identified markets as extensive 'business relations', which generate a 'community of knowledge', namely the ratio of exchange. The predominant view of this shared knowledge is that it is produced by the invisible hand (Smith, 1776). This representation means that the price mechanism is the market, i.e. the fundamental and exclusive 'institutional arrangement' for co-ordinating economic activities (Ménard (1995:169).

The term organisation is often used as identical to that of the firm. But some authors emphasise the structural similarities with other forms, such as non-profit businesses and public agencies, and therefore they expect the theory to be valid for all of these forms as it is assumed to be in the tradition of the Organisation Theory. On the other hand, it is worthwhile to note, as often happens with new ideas, there is also a great deal of conceptual confusing about the concept of organisation (Ménard, 1995:162). In this section we will use the terminology of Williamson: he uses hierarchy in stead of organisation.

The two pure governance structures we distinguish are markets and hierarchies. A major contribution of the recent literature on transactions is the demonstration of the fundamental importance of 'hybrid forms' between the two polar cases of markets and hierarchies. Hybrid forms are characterised by specific combinations of market incentives and modalities of co-ordination involving some forms of hierarchical relationship (Ménard, 1995:175). Including the hybrid forms there are three main governance structures (equivalent to institutional arrangements): markets, hybrids, and hierarchies. Table 11.1 gives an overview of distinguishing attributes of markets, hybrids, and hierarchical governance structures.

Table 11.1 Distinguishing attributes of markets, hybrids and hierarchical governance structures a)

	Governance structure		
	Market	Hybrid	Hierarchy
Instruments:			
Incentive intensity	++	+	0
Administrative controls	0	+	++
Performance attributes:			
Adaptation, autonomy	++	+	0
Adaptation, co-operation	0	+	++
Contract law	++	+	0

a) ++ = strong; + = semi-strong; 0 weak.
Source: Williamson (1996:105).

As can be seen in table 11.1, incentive intensity (= prices) plays an important role within markets whereas they are of no importance for hierarchies, whereas administrative controls play an important role in hierarchies. The hybrid form is located between the other two governance structures. Contract law is important for markets because this type of governance assumes that law can solve most of the conflicts. The choice of adaptation mode depends on (c.f. Ménard, 1996:160):

- Whether there is bilateral dependency between the contracting partners or not;
- Whether distribution between the partners of gains of trade is well determined or not.

When significant disturbances of the environment and bilateral dependency develop, transactions cost economics predicts that delays in responding will decrease the efficiency

of the price system. Further, there is an increased possibility that opportunistic behaviour of the contracting parties will considerably reduce the efficiency of the price mechanism. Compared to market relationships, hybrid forms represent a shift towards co-operation and administrative controls in order to adjust more rapidly and in a more co-ordinated way to these disturbances (c.f. Ménard, 1996:159). But this shift also weakens the monetary incentives that are the strength of the market, without providing the incentives of hierarchical structures (e.g. promotions or extended powers of decision). Because of the limited role of the price mechanism and of the uncertainties surrounding the appropriation of rent, information disclosure will be essential to the existence and stability of hybrid forms (Ménard, 1996:159).

A fundamental explanation of the existence of hybrid forms is that they enhance the capacity of firms to deal with disturbances that spot-markets could not easily meet, or could meet only at prohibitive costs, while maintaining the incentives that pure integration lacks (Ménard, 1996:161). Within a firm there are adaptations to prices and adaptations to take place because of a hierarchical relationship (see table 11.1). According Williamson (c.f. 1996:101-105), the central problem of economic organisation is adaptation to changing circumstances. He distinguishes two types of adaptations: (1) adaptations where prices serve as sufficient information and (2) adaptations through co-ordination within internal organisations. Changes in the demand or supply of a commodity are reflected in price change, in response to which participants are able to take the right action. Williamson (1996:102) refers adaptations of this kind as A-adaptations, where A denotes autonomy (see table 11.1). This is the neo-classical deal in which consumers and producers respond independently to parametric price changes so as to maximise their utility and profits respectively.

Some disturbances, however, require co-ordinated responses, let the individual parts operate at cross-purpose or otherwise sub-optimise. Failures of co-ordination may arise because autonomous parties read and react to signals differently, even though their purpose is to achieve a timely and compatible combined response. Williamson (1996:103) refers adaptations of co-ordination as C-adaptations, where C denotes co-operation (see table 11.1). Bilateral dependency introduces an opportunity to realise gains through hierarchy. As compared with the market, the use of a formal organisation to orchestrate co-ordinated adaptation to unanticipated disturbances enjoys adaptive advantages as the condition of bilateral dependency progressively builds up. But these adaptation gains come at a cost (Williamson, 1996:103).

In summary, in an economy a mix of systems is used to co-ordinate and manage various kinds of activities. The kind of co-ordination that is most effective depends on the nature of the case. In the approach of the New Institutional Economics, as elsewhere in mainstream economics, the preferences of agents are taken as given, exogenous, or performed. But now, in addition to agents adjusting their behaviour to prices, as in neo-classical theory, they also do so in relation to the overall 'incentive structure' of society. In other words, legal norms, along with other formal and informal rules, impose constraints to which individual agents respond in a rational, calculative manner (c.f. Deakin and Michie, 1997:14). Formal rules are an important part of the institutional framework but only a part. To work effectively they must be complemented by informal constraints (conventions, norms of behaviour) that supplement them and reduce enforcement costs (North, 1993:20).

11.4 Contract theory

Contracts and contracting processes play central roles in modern institutional economics. The different approaches to contractual arrangements can be structured along two broad trends. One, which is predominant in recent literature, emphasises the formal analysis of contracts, looking for conditions that would determine an optimal contract, i.e., a contract that is self-enforcing (c.f. Ménard, 1997:1). Agency theory belongs to this branch of research. In the standard principal/agent model the parties negotiate only once and on a once-and-for-all basis (Furbotn and Richter, 1991:18). The other approach points out the incompleteness of most contractual arrangements: the implementation of contracts and their enforcement necessitate filling in the blanks of the contract and imposing constraints on partners involved (c.f. Ménard, 1997:1). In this paper we will focus on the second approach and we will apply this approach to the analysis of nature conservation contracts in section 5.

Our main focus will be transaction cost economics within the contract theory. Transaction cost analysis entails an examination of the cost of planning, adopting, and monitoring task-completion under alternative governance structures (Williamson, 1996:58). Transaction cost economics within contract theory emphasises two important behavioural assumptions: (1) opportunistic behaviour of the agents (self interest seeking with guile), particularly when there is only a small number of possible partners; and (2) their limited rationality, which is of major importance when significant uncertainty prevails (Ménard, 1997:3). In general all hazards can be attributed to these twin behavioural assumptions (cf. Williamson, 1996:12).

Table 11.2 Classification of contracts a)

	Role of prices as mean of adjustment	Degree of Asset specificity	Complexity of safeguards clauses
Classical contracts	++	0	0
Neo-classical contracts	+	+	+
Relational contracts	0	++	++

a) ++ = strong; + = semi-strong; 0 = weak.
Source: based on Ménard (1997:4).

There is almost an infinite variation among clauses of contracts. At the same time, there seem to be some basic patterns that structures the variety of clauses, e.g. the very limited number of incentive devices (Ménard, 1997:2). In this section we will discuss the basic types of incomplete contracts. There is still no accepted definite and stable classification for contract types. Williamson (1998:41) draws his treatment of contracts on work of Macneil (1974, 1978) and we will follow this approach. We will start with characterising contracts by three variables: prices, asset specificity, and safeguards clauses. Table 11.2 gives an overview of the classification of contracts based on these variables.

A classical contract would be characteristic for market relationships. In these contracts, formal clauses specify most characteristics at stake, with the identity of the parties to the contract to be irrelevant and the transactions highly monetized (Ménard, 1996:157). The short term orientation makes it appropriate to regard the contract as fully expressing all the future rights and obligations of the parties while the absence or relation specific investments means that opportunism can be effectively countered by the threat of exit from the relationship or by resort courts. Law courts adjudicate in the event of a disagreement (litigation) (Lyons and Mehta, 1997:49). The courts, because of low likelihood of repeat trading, do not involve the loss of significant future goodwill (c.f. Deakin and Michie, 1997:11). Commitment plays no role in classical contracts. Classical contracts are less useful for long term contracting because not all-future contingencies can be specified in the contract.

A neo-classical contract is typically a long run arrangement in order to develop a continuing relationship. Normally the contract specifies a fixed duration or task to be completed (Lyons and Mehta, 1997:49). The identity of the parties does matter in this relationship, since bilateral dependency in non-trivial, while adaptation mechanisms must be elastic enough to enable parties to adjust to moderately consequential disturbances. A neo-classical contract defines adaptation mechanisms to improve, relative to pure market relationships, the capacity to adjust to unanticipated disturbances (Ménard, 1996:157-158). The parties accept at the outset of the agreement that the contract is incomplete, in the sense of being unable to specify their rights and obligations in all future states of the world. The parties attempt to use their agreement to plan for future contingencies by using mechanisms of 'trilateral governance', including hardship and arbitration clauses (c.f. Deakin and Michie, 1997:12). The written documentation provides the status quo point from which to renegotiate.

Relational contracts are characterised by the substitution of the legal system by a contract and its accompanying formal documents by informal agreements such as verbal promises, letters or intent, or gentleman's agreements (Lyons and Mehta, 1997:51). In relational contracting prices play a small role for adjustments, instead norms of behaviour, or shared codes of conduct, inform responses to new developments as they unfold. These norms or shared codes of conduct overrule written documents in settling outputs. The duration is normally indeterminate (c.f. Lyons and Mehta, 1997:49). In these contractual arrangements, adaptability to highly consequential disturbances is crucial, while highly specific assets create risks of opportunism that detailed safeguards are built in to reduce. Hierarchy is at the core of adaptability and operates through 'fiat', acting as 'its own court of ultimate appeal' (Ménard, 1996:157). The identities and personal attributes of parties are crucial within these types of contracts (c.f. Lyons and Mehta, 1997:49).

According to Ménard (1997:6), the diversity of institutional arrangements within the same sector and the same institutional environment is an important and intriguing issue. Although some contracts are more successful than others, there are also contracts, that almost equally important within the same sector. There are both differences and regularities among contracts besides the differences signalled above by distinguishing three basic forms of contracts. Differentiation among contracts involves three factors (c.f. Ménard, 1997:7):

- duration. The fundamental relationship is that the more specific the investments are the more continuity matters, and so the longer the duration of the contract;
- degree of completeness with regard to several specific variables, such as price qualities quantities, delays, and penalties. The degree of completeness tends to decrease when specificity of assets and uncertainty increase, the trade-off being between flexibility and security;
- enforcement procedures.

Besides the differences we can explore regularities between contracts. Regularities between contracts are (c.f. Ménard, 1997:7-8):

- there are only a few type of incentive mechanisms when it comes to fundamental design, although the actual provisions may vary largely from one contract to another (piece rate systems, hourly wages, share attributed to managers, return on assets paid to owners, and rent divided among legally independent partners to a joint project, are the basic schemes);
- adaptation mechanisms implemented by contracts are very limited in their variety (Market prices, forms of command, co-operation, and related enforcement procedures are the essential ones);
- the institutional embeddedness of contracts. Their desirability, their feasibility, and their credibility contribute largely to the efficiency or failures of contractual arrangements.

In table 11.2 we introduced several characteristics of different types of contracts. We will now elaborate on aspects of the asset specificity and safeguards. For the explanation we will follow the simple contractual schema from Williamson (1996:61-63). We use k as a measure for transaction specific assets and s as the magnitude of any safeguards. Assume that a good or service can be supplied by either of two alternative technologies. One is a general purpose technology ($k = 0$) and the other a special purpose technology ($k > 0$). The special purpose technology requires greater investment in transaction-specific durable assets and is more efficient for servicing steady state demands. A $s = 0$ condition is one in which no safeguards are provided: a decision to provide safeguards is reflected by a $s > 0$. Safeguards can either take two forms (Williamson, 1997:38):

- Credible interfirm commitment. Craft added supports to the contract, whereby penalties to deter breach are introduced, added information disclosure is provided, and specialised dispute settlement machinery (e.g. arbitration) is devised.
- Taking transactions out of the market and organising contracts under unified ownership where hierarchy (to include fiat) is used to effect co-ordination.

Figure 11.1 facilitates the comparative institutional analysis by emphasising that the technology (k), contractual governance (s) and price (p) are fully interactive and are determined simultaneously. Transactions located at node A do not need protective governance structures ('ideal' market contract). Transactions that involve transaction specific investments ($k > 0$) are effectively engaged in bilateral trade. Transactions at node B are apt to be unstable contractually (contractual hazards). Such hazards will be recognised by farsighted players, who will price out the risk in the contract (Williamson,

1997:39). There could be a tendency to introduce safeguards or to use a general-purpose technology.

Figure 11.1 gives an overview of contracting outcomes dependent on the several options concerning contracting.

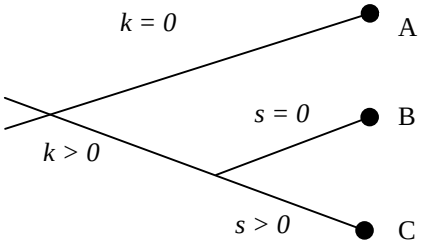

Figure 11.1 A simple contracting scheme
Source: Williamson (1996:63).

Transactions located at C incorporate safeguards ($s > 0$) and thus protected against expropriation hazards (hybrid contract). Inasmuch as price and governance are linked, parties to a contract should no expect to have their cake (low price) and eat it too (no safeguard) (Williamson, 1996:63). Safeguards, under this conception of contract will progressively build up as asset specificity increases. In the limit, interfirm contracting will be supplanted by unified ownership (vertical integration) (Williamson, 1997:15). Williamson (1997:47) extends the contracting scheme by introducing hybrid forms, the firm, regulation and the public bureau. When safeguards are incorporated ($s > 0$) there could be market safeguards which result in a hybrid form contract or administrative safeguards. The administrative safeguards could be private which results in a firm or public bureau. Finally, the administrative safeguards can result in regulation or a public bureau. Williamson (1997:46-47) sees the public bureau as the organisation form of the very last resort.

According to Ménard (1997:2) the enforcement procedures are the procedures necessary for most contracts to be implemented and/or adjusted. Ménard (1997:4) emphasises that, with the possible exception of 'classical contracts' which correspond to agreements that are essentially self-enforcing (e.g. spot markets) all these forms of contractual problems raise problems of enforcement, encapsulated in the 'safeguards' variable. We already paid attention to the existence of safeguards and the role of law in contracting. We also paid attention to different forms of safeguards: market/administrative; public/private and regulation/public bureau.

Table 11.3 Contracts, governance structures, and enforcement procedures a)

		Complete contract?	
		No	Yes
Complex Contract?	No	*Firms* Private ordering (I)	*Markets* Self enforcing (II)
	Yes	*Hybrid forms* Mix of private and public ordering (III)	*Agency* (IV)

a) Italics indicate the governance structure; underlined terms indicate the dominant type of enforcement procedures.
Source: Ménard (1997:24).

Table 11.3 gives an oversimplified, but synthetic view of interdependencies between the characteristics of contracts, the governance structure, and the mechanisms of enforcement that tend to prevail.

The diversity of contractual arrangements and its analysis suggests that contracts are more or less complete and more or less complex. Incompleteness results from bounded rationality. A bounded rational individual attempts to maximise but finds it costly to do so and, unable to anticipate all contingencies, and aware of this inability, provides ex ante for the (almost inevitable) time ex post when an unforeseen contingency will arise. Given this insight, the theory of incomplete contracts emerges as an inevitable development (Kreps, 1990:745). The incompleteness of contracts will increase with the specificity of assets involved, i.e. from markets to hybrid forms and to firms. There could be a reliance on incomplete contracts if economic agents were wholly trustworthy. But realistically, since there is, in Williamson's phrase, 'self-seeking with guile', and since it is normally very costly to distinguish opportunistic from non-opportunistic actors ex ante, comprehensive contracting breaks down (Furubotn and Richter, 1997:4). According Ménard (1997:13-14) complexity is likely to be its peak with governance structures of the hybrid form, with its combination of autonomy of rights and tight co-ordination of transaction.

Within firms (table 11.3:I) private ordering prevails (nonlegal sanctions), with very few interference's from the judiciary. On markets (table 11.3:II) contracts are largely self-enforcing, with the institutional environment interfering only in last resort, through credible arbitrators. Hybrid arrangements (table 11.3:III) are enforced through a complex set of rules, mixing private ordering, i.e., an authority acting as the government of interdependent firms, and public ordering, i.e., the legal rules and political arrangements regulating this class of governance structure (Ménard, 1997:25).

The fourth quadrant (table 11.3:IV) represents no specific governance structure. According Ménard (1997:25-26) this is typically the territory of Agency Theory, which considers all forms of contractual arrangements as a continuum, making governance structures irrelevant. Contracts tend to be complete, although they may have to be very complex. Agency theory is continuously looking for the optimal contract, in which built-in mechanisms would also be self-enforcing. According to that perspective, there is almost no room for enforcement procedure other than the built-in mechanisms (c.f. 1997:26).

11.5 Contract Theory: the case of nature conservation

In the previous section we paid attention to co-ordination and contracts from a theoretical point of view. In this section we discuss several types of governance structures used to co-ordinate nature production. As we have seen before most of the mechanisms are more or less vulnerable to co-ordination problems (market and non-market failures). In the ideal market no co-ordination problems will arise; everything is co-ordinated by the price mechanism. In this section we will explore co-ordination problems in nature conservation in the Netherlands. The contractual relationships are illustrated in figure 11.2. We are mainly interested in contractual relationships in which farmers participate: A_4, A_5, B_1, B_2, and C.

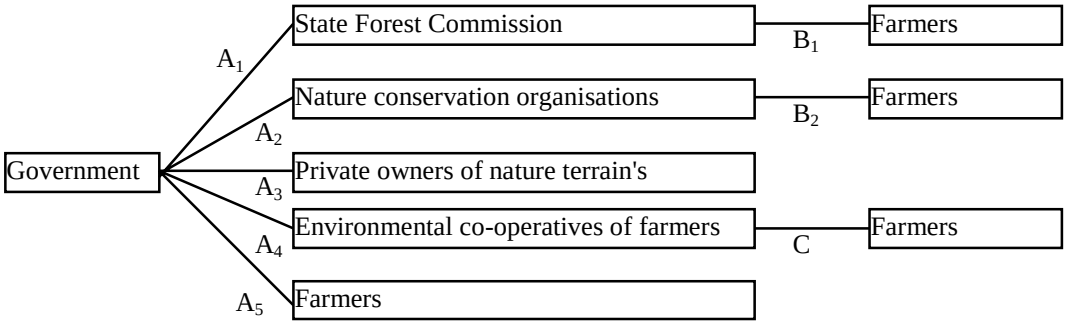

Figure 11.2 Relations in nature conservation in the Netherlands. The different arrows refer to sets of relations

At the moment (end 1998) we have in the Netherlands about 50 environmental co-operatives of farmers (more than 4,000 farmers and about 50,000 ha), which have an agreement with the government to achieve certain targets and agreements with individual farmers to carry out certain tasks (case A_4 and C). The type of contracts varies among and within the co-operatives. Contracts for grassland birds are quite common. Other possible contracts are for instance botanical grassland management (field margins) and small scale nature development. The environmental co-operatives often work together with volunteers for controlling the nature production. Controlling is labour intensive and presumes knowledge about the flora and fauna by both the farmer and the volunteer. At the moment we do not have much experience with agreements between environmental co-operatives of farmers and individual farmers due to the relatively short period that co-operatives exist. The contract would be a neo-classic type; the enforcement mechanism is a mix of private ordering and self-enforcing and the governance structure is hybrid. Arrow A_5 refers to the government who concludes different types of agreements with individual farmers. The most import types are:

- *Maintenance agreements*
  Under maintenance agreements, farmers are obliged to maintain, in a specific way, one or more 'nature elements', such as hawthorn hedges, windbreaks or pollarded willows, pools, in exchange for compensation. An important incentive mechanism are the hourly wages.

- *Management agreements*
  The most important characteristic of management agreements that farmers must eschew certain treatments, and hence land use is restricted. The totality of the management obligation to which the contractor binds himself and the compensation to which he is entitled are referred to as the management package. These management agreements are mostly passive in nature conservation; certain management activities are modified (e.g. mowing or livestock grazing are postponed), or scrapped (e.g. fertilising, scarifying). The compensation farmers receive is intended to compensate for the resulting production loss.
- *Agreements based on compensation for 'products delivered'*
  The reward for 'nature production' depends on the results, i.e. on the 'products delivered': for example, a payment per clutch of eggs of certain rare meadow bird species, or a payment proportional to the number of rare plant species found in field. An important incentive mechanism is the 'piece rate system' and the enforcement procedure is mainly self-enforcing.

The governance structure of these agreements could be 'market' or 'hybrid'. Simple maintenance agreements or management agreements like the 'less favoured areas' agreement have the character of a classic contract. The degree of asset specificity is small, just like the complexity of the safeguards clauses. That is not the case with management agreements like 'grassland bird management. The degree of asset specificity is much higher and the safeguards clauses are more complex. It is more a neo-classic contract. Agreements based on compensation for 'products delivered' are contracts which are largely self-enforcing. The role of prices is important. However the degree of asset specificity is high. The latter aspect makes it more a neo-classic than a classic contract. Generally spoken the governance structure of the agreements (a), (b) and (c) together is hybrid.

In the case of the contractual arrangements B_1 and B_2 farmers are often contracted to perform some tasks according to specified standards in a given time period, like mowing of grass at a given period at a rent, grazing of animals against at a rent. This type of contract has often the character of a classical contract. The duration could be short; the price as incentive is an important decision variable; the degree of asset specificity is limited just like the complexity of the safeguards clauses. In case of difference of opinion is private ordering (contract law) the enforcing mechanism. On the other hand we also see in actual practice long-term relationship based on trust. In that case we have more to do with relational contracting. But in case of difference of opinion the enforcing mechanism stays contract law.

In the case of B_1 and B_2 the farmers are not the owner of the land the parties agree on other contracts. The (nature) lease contracts are part of the Dutch Agricultural Holdings Act [1]. It is possible to lay down extra obligations to conserve nature in the lease contract when the land is part of certain reservation areas. Agricultural lease is a civil contract, but there is a large amount of public intervention in the contract. Land Chambers (entrusted with supervision of contracts of agricultural lease) and the agricultural chamber of the subdistrict courts (entrusted with jurisdiction in case of agricultural lease) play an

[1] Article 70a. Agricultural Holdings Act.

important role (Hartkamp and Tillema, 1995:200). A part of the arable land owned (historically special) by this organisation are meant to be preserved as arable land (e.g. landscape characteristics and special species). Farmers (or private firms) are contracted to perform some tasks according to specified standards in a given time period.

The most important characteristics of the contracts between de parties presented in figure 11.2 are summarised in table 11.4. The relations between the different parties are given in the columns. The attributes give the distinguishing attributes of governance structures. This table is related to table 11.1.

Table 11.4 Classification of characteristics of relations a)

Governance structure attributes	A_1 hierarchy	A_2 hierarchy	A_3 hierarchy	A_4 hybrid	A_5 hybrid	B_1 hybrid	B_2 hybrid	C hybrid
Incentive intensity	0	0	0	+	+	+	+	++
Administrative controls	++	++	++	+	+	0	0	0
Adaptation: autonomy	0	0	0	0	++	++	++	++
Adaptation: co-operation	++	+	+	0	+	0	0	+
Contract law	0	0	0	0	0	0	0	+
Characteristic of contract	relational	relational	relational	neo-classic	neo-classic	neo-classic	neo-classic	neo-classic

a) ++ = strong; + = semi-strong; 0 weak.

In section 11.4 we discussed asset specificity as a variable to classify contracts; here we will explore the specificity of nature preservation contracts. Site specificity plays an important role for nature conservation. For instance, acquiring and managing protected areas as well as encouraging appropriate wider countryside measures (through agricultural incentive mechanisms) is important in order to maintain key concentrations of grassland birds. However, these measures alone will not be sufficient to conserve viable national and international populations throughout their ranges (c.f. Beintema et al., 1997:269). We can also argue that there is a form of time specificity: when an agreement is crafted the principal wants the farmer to continue for several years because the continuation of a conservation agreement is important. For instance, with continuity on 75% of the parcels in an area, a stable population of grassland birds can be achieved. When there is continuation on only 50% of the parcels (shifting after 7 years) the population will still decrease.

In normal conservation areas only one percent of the farmers yearly quit their conservation agreement (DLG, 1996:15). For a farmer continuation is important because he will be investing in nature conservation: he is making transaction specific investments. Human assets involved are also important because of the knowledge needed to carry out management agreements. For grassland birds this point is less important than for recognising species such as plants. Physical assets can also be quite important; for instance old grown hawthorn hedges cannot be replaced within week by hedges with the same characteristics. Dedicated equipment is less important. From the previous discussion we

can conclude that asset specificity can play an important role in the agreements concerning nature conservation.

From the existence of asset specificity in nature conservation contracting we can conclude that there is a degree of mutual dependency between the government and the farmer after the first time contracting. Depending on the degree of dependency the number of safeguards plays a more or less important role and 'ideal markets' are more or less useful. Contracts on these markets (classical contracts) are very specific, with prices as the variable of adjustment, and are easy to monitor; courts can implement them (Ménard, 1996:158).

11.6 Summary and conclusion

In this paper we used the transaction cost approach for analysing nature conservation contracts. One of the key elements of the approach is the governance structure. The essence of Williamson's account of contractual governance is that particular mechanisms or structures will emerge as a response to characteristics of transactions, in terms of the degree of asset specificity (the extent of relation specific investments) and the frequency of contracting. The relevant criterion for comparing contract forms is to which extent an outcome, for which no superior alternative can be described and implemented with gains, is presumed to be efficient.

Within the same setting of nature conservation several governance structures exist. In this paper we focused on those relations in which farmers are involved. The asset specificity's results in a degree of mutual dependency, which has consequences for the appropriate governance structure. Hybrid and hierarchical forms are quite common in nature conservation. Most of the contracts are relational or neo-classical contracts, although some contain classical elements.

In practice it is difficult to come to a perfect and fully discriminating distinction between the several contract types in nature conservation. Many contracts have several aspects of different co-ordination mechanisms. This paper is a first step in a project concerning institutions and incentives to combine agriculture with the conservation of wildlife and landscape.

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