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WATER (MANAGEMENT) AS A DECISIVE FACTOR IN THE LAND USE PLANNING OF AGRICULTURE IN AN URBANISING CONTEXT

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Abstract: The present planning policy and research in Flanders is dominated by a planning discourse that considers city and countryside as antipoles. This discourse ignores the strong coexistence of urban and rural functions and activities on the countryside and is no longer tenable within the concept of network society. This paper discusses three alternative planning discourses about the relationship between city and countryside which try to meet the characteristics of network society in a different way: city and countryside as networks of activities, as systems of places and as ecosystems. Because of the size of current water issues in the countryside, each of these discourses focuses on water management: as the main structuring principle in the ecosystem discourse, as an identity builder in the systems-of-places discourse or as an element of selective weaving of urban and agro-industrial water networks in the network-of-activities discourse. In these three discourses, water management is not a separate sector nor divided over different policy sectors. Water management concepts are integrated in an overall vision on how urban and rural functions and activities in the countryside should interrelate.

Introduction

Flanders (northern, Dutch speaking part of Belgium) is very densely populated. The result is an outspread settlement structure, characterised by an enormous amount of residential dwellings, commercial and economic activities all over the countryside. Major parts are urbanised and/or still urbanising. Former vast agricultural areas, even those suitable for agriculture, have been fragmented. It seems as if the agricultural enclaves have become the backyards of the houses of those that have moved from city to countryside. As a consequence, especially the centre of Flanders in between the main cities of Brussels, Antwerp and Ghent (“Flemish Diamond”) can be considered as a laboratory for research on the planning policy for agriculture in a specific context of outspread urbanisation. Nevertheless, to this day policy and research stick to the traditional approach of agriculture as a purely economic activity. It still seems a bridge too far to question the traditional legitimacy of agriculture in planning, claiming the majority of the surface, merely because of economical reasons.

Questioning the traditional legitimacy of agriculture in planning is also questioning the discourse that has been dominating planning policy for the last three decades, not only in Belgium but in the most of North-Western Europe. This dominant discourse considers city and countryside as antipoles and, still today, is translated in planning initiatives that strengthen compact cities and restrict new developments in the countryside.

This discourse is however no longer tenable within the concept of network society, especially in the urbanised Flemish region where numerous urban activities and functions are silently and autonomously taking over the countryside. Therefore, it is inspiring to evaluate the development perspectives for agriculture of three alternative planning discourses about the relationship between city and countryside. These alternative discourses try to meet the characteristics of network society in a different way than the dominant discourse: the first one considers city and countryside as networks of activities, the second one sees them as systems of places with an identity and the last one defines the ecosystem as the common layer of city and countryside.

In a study area in the Western part of Flanders, it becomes clear that each of these alternative discourses is confronted with water(management) as a decisive factor in the planning of the land use of agriculture in relation to urban activities. This is obvious for the ecosystem discourse as water is one of the driving forces in the ecosystem. But also in the network-of-

activities discourse the exhaustion of the ground water supply seems to be one of the main frustrations between the international farming industry network and the local/regional urban network of villages. Finally, water seems to be an important factor in defining and planning the identity of places in the system-of-places discourse.

The paper will primarily focus on the theoretical background on planning discourses about city and countryside. Consequently it will summarise the results of the research on planning perspectives for agriculture of the three alternative discourses in the study area. First, to set the minds, urban sprawl in Flanders is characterised.

1. Characterisation of (agriculture in) urban sprawl in Flanders

1.1. Urban sprawl in Flanders

Flanders has a population density of 443 inhabitants per square kilometre. The concentration of activities expresses itself in a very dense infrastructural network and an omnipresent sprawl. Not only the Flemish Diamond, but also the neighbouring regions and the more remote areas around one or more smaller cities, are often urbanised or still urbanising. Kesteloot (2003) calls Flanders one urban network, albeit a network made up of small cities. It is one big city in the form of a network of many, relatively small urban centres instead of one global city.

Almost 70% of the Flemish population lives in an urban complex, this is a region that is dominantly structured by suburbanisation from and commuting to and from one of the nine Flemish urban agglomerations or Brussels. Remarkably, only 10 to 12% of the population lives in urban centres; the majority lives in a suburban environment.

Even more relevant is the ratio between the total surface of the urban complex and the population of the urban agglomeration. For Brussels this ratio is 0,53 ha per inhabitant, compared to 0,33 for Frankfurt, 0,22 for Paris, less than 0,2 for London and the Ruhr area, 0,11 for the Randstad Holland (Kesteloot, 2003). Along with the residential suburbanisation, economic and commercial activities and services sprawl.

Qualitatively, a rural continuum survives under and through this urban continuum. Both layers are present in pure forms – the historical town centre and the real countryside – but in most cases they exist in overflow as simultaneous projections of two images (Loeckx and De

Meulder, 2003). According to De Boeck (2002), the most densely urbanised regions in the Flemish Diamond still contain 60% undeveloped area. The Diamond is a patchwork of urban and landscape relicts, a juxtaposition of the artificial and the apparently natural. Moreover, the Diamond still idyllically refers to nature, a perception that attracts most inhabitants to this surrogate for living in the countryside. Dehaene (2003) states that Flanders can be read as a generalisation of a low dynamic development, open and flexible, without overheating.

1.2. Agriculture in a sprawl context

It is in this overflow of rural and urban continuum that agriculture has to be situated in a major part of Flanders. Contrary to the Netherlands, and especially the Randstad, where the urban overflow is mainly concentrated in the fringe of or in between the major cities around the Green Heart, the Flemish countryside is characterised by a general state of urbanisation or sprawl.

Historically, agriculture, residential development, artisan manufacturing, ... have always coexisted on the Flemish countryside in a pattern of small scale spatial interweaving. This coexistence once used to be an international economic strength because of the direct functional relationship between the farms, the processing of products in small farm and (non-farm but) home bound enterprises in the countryside and the (international) commercialisation in rich medieval cities such as Ghent.

Nowadays, because of modernisation and scale enlargement in agriculture and because of the shift of the processing of agricultural products to industries, this coexistence has grown poorer and seems to have become a weakness instead of a strength. There is no longer a direct functional or economic relation between inhabitants of rural dwellings and the surrounding agricultural activity. Moreover, these inhabitants even seem to become fed up with the nuisance of farming. Processing industry no longer is dependent on local agricultural activity. If it is more profitable to import products from another region or abroad, industry will not hesitate to do so. To conclude, the regional functional coexistence of agriculture and other activities has disappeared but the spatial result of the former coexistence, the spatial mix of agriculture and other activities, is still present.

One of the major challenges in Flemish spatial planning policy for the countryside will be to address this switch in coexistence of activities. This switch in scope will undoubtedly have implications for the development perspectives of agriculture.

2. Dominant planning discourse of city and countryside as antipoles

2.1. Current planning policy for agriculture

The current framework for Flemish planning policy – the Spatial Structure Plan for Flanders (SSPF, 1997) – contains a vision on the future development of agriculture: “In 2007, based on the area that is nowadays really in agricultural use and starting from the existing agricultural zones in the zoning plans, 750.000 ha agricultural area will be defined in zoning plans” (Ministerie, 1997:393) (approx. 60 % of the total surface). This quantitative ambition is merely based on a very basic overview of the economic evolutions – in percentage – in 13 relevant agro-business complexes (Viaene et al., 1996). In the political decision making process of the SSPF, the prognosis – an area in agricultural use in 2007 of 585.000 ha – was completely ignored and the quantitative goal was politically defined at 750.000 ha, as mentioned above. This was mainly the result of the lobbying of agricultural professional interest groups: they suggested to keep the area, in agricultural use in 1992, unchanged till 2007 because of the uncertainties at the European and international level.

Also the qualitative development perspectives in the SSPF suggest a focus on merely the economic aspect of agriculture: the zoning of vast agricultural areas, the differentiation in possibilities to build agricultural constructions, the expansion of existing and the location of new farms and processing firms, the recognition and support of areas of regional agricultural specialisation and the zoning of areas for industrial agriculture (Ministerie, 1997).

To conclude, the area demand of agriculture is defined from a strictly economic point of view, conserving an area as large as possible for professional agriculture through zoning and eventually through very limited differentiation. By the way, this Flemish planning approach of agriculture is not a solitary phenomenon. The area demand of nature is analogously defined from an exclusively ecological point of view (see Leinfelder, 2003; Custers et al., 2003).

2.2. Discourse of city and countryside as antipoles

Agriculture and nature are considered to be weak, low-dynamic functions and activities for which area has to be guaranteed in an early planning stage, motivated by conservationist economical and ecological arguments. Planners are convinced that agriculture and nature can only survive if embedded in large and vast units. Question: who or what is the (common) strong, high-dynamic, live-threatening enemy? To answer this question, it is necessary to

zoom out and to characterise the planning discourse in which the policies for agriculture and nature have been developed.

In this context, a planning discourse should be considered as a more or less coherent ensemble of ideas that is constructed and reconstructed in an interaction between researchers, planners, designers, policy makers, politicians and interest groups (Hidding et al., 1998). Boonstra (2003) describes it as a common interpretational framework on (aspects) of development, use and management of space. Differences in discourses are expressed in problem definition, proposed solutions, concepts and metaphors, management options and roles of actors. Both descriptions seem to elaborate more on the definition by Hajer (1995:44): “a specific ensemble of ideas, concepts and categorisations that are produced, reproduced and transformed in a particular set of practices and through which meaning is given to physical and social realities.”

Despite the historical and apparently never ending socio-cultural urbanisation of the Flemish countryside, on to this day (planning) policy aims for a morphologically and functionally different approach of city and countryside. According to Hidding et al. (1998) and Hidding and Wissershof (1999), this discourse of city and countryside as antipoles has dominated planning for decades and considers the expansion of urban functions all over the countryside as the common enemy of agriculture and nature. This is the reason why the discourse considers city and countryside as separate morphological and functional entities that have to be kept apart and why it ignores the processes that are occurring beyond the borders between city and countryside. As a consequence, city and countryside should be planned separately within an overall, simplified vision of strengthening compact cities and restricting new developments in the countryside. (Hidding et al., 1998) Also the vision of the SSPF – “Flanders, open and urban” – embodies the antipole discourse and has had clear effects on provincial and local planning initiatives that have copied this discourse.

Planning policy that is associated with this discourse is convinced that agriculture and nature can take a stand against urban development. If a plan guarantees an economic development of agriculture and an ecologically sound development of nature in vast areas, these two activities should be able to withstand urbanisation. This belief however makes abstraction of the numerous gradients between city and countryside, all over and especially in the Flemish Diamond. Besides the name it got in the SSPF, little planning policy has been formulated.

Reality is however harsh. The autonomous transformation of agricultural housing in residential dwellings, children's farms, riding schools, small enterprises, garden shops, restaurants, software offices, ... results in a stealing invasion of urban activities on the countryside. This silent take-over still continues and seems to be socially accepted. Policy also seems to adjust quite easily taking generic policy measures for altering houses, industrial buildings and pony, sheep and horse shelters in the agricultural areas of the zoning plans. The spatially dominant form of Flemish agriculture – farms with a mix of cattle, meadow and arable land – doesn't seem to be performing well enough to keep the urban activities away from the countryside.

3. Trying out alternative planning discourses about the relationship between city and countryside

It is not inconceivable that the definition and elaboration of a new image of the future of agriculture and the implementation of measures and rules to realise this image by simultaneous coordination of several divergent and apparently independent planning practices lead to a uniformisation (Van der Ploeg, 2001). The involved experts are likely to create a new and exclusive domain of the undisputable in which only those actions that correspond with the future image will be considered valid. Everything else is de-legitimised in advance.

This explains why it is necessary to try out several alternative planning discourses. It is not only impossible to discuss new development perspectives for agriculture within the existing dominant planning discourse because it would always result in the same options. In our complex network society, it is also impossible to put one planning discourse forward as the ultimate answer to the changing relationship between city and countryside.

Hidding et al. (1998) define three discourses as alternatives for the dominant discourse of city and countryside as antipoles: city and countryside as networks of activities, city and countryside as ecosystems and city and countryside as systems of places. These discourses don't seem to be mature enough yet to rule as main planning discourses: they are subdiscourses that might develop to main discourses. Furthermore, these discourses don't need to exclude one another. The intense mix of activities and the mosaic of places in urban networks suggests a combination of discourses. The best discourse will probably consist of elements from all discourses.

The relevance of the three discourses is however that they can be tested in their consequences for the land use by certain functions, e.g. agriculture, and that these consequences can be compared to those of the dominant discourse. By starting off from planning discourses, it is the ensemble of ideas about the development of a region that will determine the development perspectives for agriculture and not vice versa. In this way alternative images of the future role of agriculture in society that are perhaps closer to reality than those within the dominant discourse will be set clear.

Undoubtedly the trying out of the three discourses asks for assumptions and, as a consequence, is vulnerable. The advantage is however that they create the possibility to get out of the fossilising dominant discourse and put things in another perspective.

Since March 2004 the Centre for Mobility and Physical Planning of the Ghent University coordinates a research project on how these three alternative discourses could result in new planning concepts for agriculture in Flanders¹. Two different methods are used: first, the three discourses are implemented in three different sub areas of the urbanising area between Roeselare and Kortrijk (in the western part of Flanders); secondly, the three discourses are implemented simultaneously in one sub area in the fringe of Brussels

3.1. Discourse of city and countryside as networks of activities

This discourse focuses on the relations between functions and activities at different scales. It could easily be narrowed to the approach of society as an ensemble of high-dynamic physical connections and nodes and low-dynamic meshes. A broader interpretation seems more appropriate. Boelens (2004) suggests to consider the reclustering of the traditional (mono)functional fragmentation into new forms such as residential-work, work-recreation, recreation-residential, agriculture-care-clusters on the most appropriate places. The spatial logics of these relational clusters have to form the basis for a new conceptual framework. Logics can be situated within a relational cluster at one specific scale – probably a big part of the daily recreation-residential cluster – or at different scales – such as the residential-work cluster of the employee of a maritime multinational that lives in an average Flemish residential zone.

¹ The research is financed by the scientific Program for the Support of a policy for Sustainable Development II, part I-Sustainable production- and consumption patterns of the Federal Public Service. Besides the Centre for Mobility and Spatial Planning (authors of the paper), the research group OSA and the Institute for Social and Economic Geography of the Katholieke Universiteit Leuven and the Department of Agricultural Economics of the Ghent University are involved.

The new conceptual framework within this discourse will have to meet two challenges. The first one is trying to answer the logics of the different relational clusters at their specific scale. The second one is avoiding frustration between and stimulating mutual strengthening of logics at different scales. Measures are mainly directed towards restructuring networks of activities (making and undoing nodes) and rearranging border zones between networks.

3.2. Discourse of city and countryside as ecosystems

This discourse focuses on the physical system and the use of it. Ryckewaert (2002) stresses the importance of the physical system by stating that the isotropy of the outspread Flemish settlement structure is not only caused by footloose settlement logics but also and for an important part by patterns that are initiated through geomorphological patterns and efficient land use.

The planning discourse is closely related to that of the layer approach in the Dutch Fifth Planning Document. This approach distinguishes a basic physical system layer, an infrastructural (network) layer and finally an occupation layer. Because of the differences in transformational dynamics, each layer defines preconditions for the development of the following, more dynamic layer.

The new conceptual framework within this discourse will also have to meet two challenges: ordering the relatively autonomous processes of each layer to follow an own specific logic on the one hand, and offering guiding principles for the differences in dynamics between layers (Dietvorst en Hetsen, 1996).

3.3. Discourse of city and countryside as systems of places

The central item of this discourse is the *genius loci* – identity, atmosphere and characteristics of a place. The discourse is not only a postmodern reaction to global trends of uniformisation and acceleration by creating recognisable surroundings in which the individual can regularly withdraw in a certain sense of safety (Hidding et al., 1998). Identity, atmosphere and characteristics of a place are also increasingly important factors in the choice of a location. Albrechts (1999) refers to the importance of a functional specialisation of regions (places), not as much in the form of a clear monofunctional economic structure, but in an availability of a broad range of (economic) activities. The region/place tries to find a unique label or image. According to Healey and Graham (1999) in Albrechts et al. (2003), this results in the “relational space” in which places simultaneously have multiple meanings.

The new conceptual framework within this discourse doesn't have such "tangible" terms such as scale or layer to build on. Challenge is to aim for significant places in relation to the surrounding urbanised and urbanising context. Measures will take the form of balanced programs of additional elements and the allocation of functions and activities based on the identity of the place at a higher scale.

4. Water management as a constant through the planning discourses

In the study area between Kortrijk and Roeselare, it has become clear during research that each of the three alternative discourses is confronted with water(management) as a decisive factor in the planning of the land use of agriculture in relation to urban activities in the countryside. In this chapter, this will be illustrated briefly for the ecosystem discourse and the systems-of-places discourse and more in detail for the networks-of-activities discourse.

Preliminary, it has to be stressed that in the sectoral planning approach of the dominant discourse of city and countryside as antipoles, water management is not a separate sector but divided in parts amongst the different sectors: each function or activity has specific demands and creates its own sectoral logic concerning water management. Interaction between sectors is limited, resulting in more or less divided and separately functioning water systems. Internal problems within one water system, such as water shortage or water overload, are usually handled through a set of internal technical measures. As an integrated approach of water management has never been considered today, some sectors find themselves facing serious problems as technical limitations are reached. This enlarges the necessity of an integrated water management.

4.1. Water management in the ecosystem discourse

The area between the rivers Scheldt and Lys is marked by a range of southwest-northeast oriented hills which forms the water division between the two rivers. On both sides, the hill range is incised by several smaller brook valleys. The erosion of the hillsides by the brooks transformed the hill range into a gently curved relief. The difference in altitude between the central hills and the lower part of the river valleys is about 70 meters.

The water system in the area can be seen as a connected system of infiltration areas, well areas and brook valleys. This spatial arrangement is closely related to the geological structure

that consists of horizontal layers of permeable sand and impermeable clay. The upper geological layer of the hill range consists of permeable sand and functions as infiltration area. Ground water bubbles up where topography cuts through the impermeable clay layer; wells are commonly found at an altitude of about 60 meter and display the same spatial characteristics. From the well, a large portion of the water finds its way in brooks with a strong eroding force, because of the badly permeable soil.

This characteristic spatial arrangement of infiltration areas, well areas and brook valleys forms the basis for the natural structure of the landscape. As the water flows from high to low in different ways, a strong variation in nutritional richness and dynamics exists depending on the position in the water system. The contrasts in dynamics and richness between the surface and ground water system result in a diversified pattern of landscape structures and ecosystems, from sour beech and oak woods in the infiltration areas to rich alder woods in the well areas.

Through time, the characteristic landscape structure has faded or totally disappeared by human interventions in the water system.

First, agriculture has intensified. As a result of interventions in the water system such as draining, diffuse water pollution, straightening brook valleys and excessive use of fertilizers, landscape has evolved from a delicate mosaic of hedges with wooded ridges to an open field landscape with less variation.

Secondly, urbanisation has spread over the countryside. The traditional urbanisation pattern was grafted upon the natural conditions of the water system. Villages, communes and farms were established along brook valleys and wells, closely linked to the availability of drinking water. Since the industrial revolution, a radial pattern of paved roads, railway and tram lines between village centres sliced straight across the hills. This hierarchical structure acted as a framework for successive urbanisation and led to new hamlets at train and tram stops and fragmentary ribbon villages. During the post-industrial age, the regional network of paved roads was attached to a new international network of highways. Due to the many exits of the highway infrastructure (every 3 kilometres!), the region was opened up by a comb-shaped network of connecting roads over the hills. The urbanisation pattern disregarded the water system: brooks were criss-crossed by infrastructure and valleys were built in which causes more flooding, erosion and pollution.

The control of the water system and the revaluation of the characteristic landscape structure seem to be the two central themes in the ecosystem-discourse for this area. Urbanisation patterns as well as the land use by agriculture will be allocated based on the restrictions of the water system.

First, the development of a robust natural wood, taking into account the characteristic qualities of the water system, offers new opportunities to recreation and housing in the wood. Secondly, the traditional zoning of land use in planning – residential zones, agricultural zones, and natural zones – will be replaced by the definition of spatial conditions – such as production landscapes and water-collection landscapes. The allocation of functions and activities by defining of spatial conditions starts from the concept of multiple land use: several combinations of activities are conceivable, albeit within the restrictions of the water system.

A differentiation in land use for urbanisation (building density, infiltration possibilities, degree of forestation, ...) as well as for agriculture (land use on the basis of the local need for water by agriculture, the emissions of fertilizers, ...) is an alternative for the rigid opposition between city and countryside.

4.2. Water management in the systems-of-places discourse

The discourse is implemented in the densely urbanised corridor between Kortrijk and Waregem. This study area is part of the larger cross-border urban network around Lille: the Kortrijk-Waregem corridor stretches north-eastwards along the E17-highway from Lille towards the Flemish Diamond. The dense urbanisation is the result of successive waves of occupying countryside between towns along major parallel infrastructures.

In order to clearly understand the urbanisation processes, it is important to analyse the historical relation between urban centres, agricultural land use and the underlying physical and especially hydrological system.

In the pre-industrial era the countryside was predominantly an agricultural area. The wetlands in the valleys functioned as meadows for cattle and the more fertile sand ridges were intensely used for arable farming. The first towns were positioned on the sand ridges along the banks of the river Lys and served as nodes in an all-encompassing agricultural network, opening up the entire area between the rivers Lys and Scheldt for agricultural exploitation.

In the boom period of the Flemish textile industry, the region attracted a lot of workers and the small rural towns grew rapidly. Wetlands and valleys remained open however, because of their important role for cultivation and processing fields in the flax and linen industry.

Due to the collapse of the textile industry after the second world war, the entire region was confronted with urbanisation. The open landscape transformed into a juxtaposition of all kinds of activities – ranging from residential estates, shopping and recreational centres to mono-functional industrial and logistical areas – rendering the entire territory into an urban nebula. Within this nebula the remaining open spaces no longer have a structuring position. Farmers tried to sell as much as possible farming land that had been turned into over-sized residential zones in the zoning plans of the mid seventies. By the end of the 20th century the structuring capacity of valleys, wetlands and sand ridges had been replaced by an urbanisation pattern organised around new highway and expressway exits, ignoring the significance of the landscape.

Today, the remaining open space no longer has a structuring capacity within the Kortrijk-Waregem corridor. The current landscape is a negative space in which open spaces can be considered as residual spaces of the urbanisation process, just waiting for a new function in an urbanised context. The traditional division between city and countryside is, in this area, no longer tenable. The possible function and organisation of the remaining open space are therefore in need of a totally new planning discourse.

The open space is no longer linked with an economic function (as production space) or no longer has an ecological function (as nature protection area), but can serve as a meaningful space within the emerging (mostly urban) experience economy. In order to play a determining role, it is important to give the remaining open spaces a significant meaning and profile again.

In order to be significant, a meaningful space must exceed the personal meaning and identity for the individual and become structuring at the scale of the entire Kortrijk-Waregem corridor. Therefore, the regional scale is a very important element in generating places with a strong identity. Considering the remaining spaces at a regional level, further fragmentation of open space can be avoided.

A second element of identity is the program or theme of the area. Although water-related activities are not predominantly present in this area, also water could be an important generator for new activities strengthening the character of the open space. Adding functions

and activities to open spaces will indeed revitalise these areas and give them a meaning and significance in the region again.

A program or theme also has a downside: the pressure on the open spaces will continue to grow because of their higher attractiveness. In order to limit the effects and the meaning to a certain area, these open spaces need clear boundaries. Not only does the boundary stop undesired urbanisation in the remaining open space, it especially helps to define the identity of an area: by crossing a clear border, a new area with a distinct identity is entered.

These areas and their programmes should not function as isolated enclaves within the urban fabric, as is the case for shopping malls, residential estates and logistical parks. Open spaces are part of the entire urban corridor and should function complementary to more typical urban functions. Therefore, some kind of functional and mental connection between these distinct areas should be created.

Three important project areas can be detected within the Kortrijk-Waregem corridor that could, due to their specific hydrological conditions, manifest themselves as meaningful open spaces within the urban nebula. Water plays a determining role in reinforcing these open spaces at a regional level. The three project areas have different water structures (river valley, wetlands with canals, artificial lake) which can result in a totally different identity and use of the open space.

The valley of the river Lys can regain the structuring capacity it once had. The valley can have a threefold function. Firstly, it can link the remaining important open space fragments and can be used as a water retention area for surrounding towns. Secondly, the valley can serve as a recreational and tourist corridor, not only connecting Kortrijk with Waregem but even beyond the region with Ghent or the Lille conurbation. Thirdly, a new structure for the entire valley can raise opportunities but also limitations for the urbanisation along the river. In some areas, reintroduced wetlands can pose a halt to the ongoing building activity in the valley, but the distinct border between water and town can also be a generator for waterfront development and add new public spaces to the urban centres.

In the agricultural area between the old sand ridges, former wetlands and the grid-like network of draining canals can reorganise the use of the diffuse open space. The parcels, delimited by canals, can host a multitude of new forms of recreational and consumer driven agricultural activities and even residential functions. Adding a network for cyclists and hikers on top of the water structure can open the area to potential users and residents. The combination of canals, paths, vertical vegetation and solitary buildings into a large scale

mosaic-like pattern can shape the regional landscape. This will not only strengthen the identity of the open space as a whole but will still leave room for a diverse use and interpretation of the area.

On a former sand extraction pit, water sports can be intensified, giving it a clear identity in relation to other recreational areas. The large water surface and the surrounding water related activities can function as the new centre for Harelbeke, today a scattered town consisting of primarily residential estates.

4.3. Water management in the networks-of-activities discourse

First, the spatial logics of the principle of ‘networks of activities’ are analysed. This principle focuses on physical flows as a result of functional relations between activities. Physical flows – such as transport, energy and water – depend on structural networks that could have a spatial impact. A map of the functional relations and the physical flows is a first objective of this case study.

Secondly, the introduction of new functional relations leads to the establishment of new structural networks, necessary for the support of physical flows. Two interventions in the structural networks in order to optimise the physical flows can be distinguished: a separation of conflicting networks and an interlacing of complementary networks. Optimising structural networks is a second objective of this case study.

The discourse is implemented in the region of Roeselare, located in the south-western part of Flanders. Internationally, Roeselare is situated in the periphery of the urban network Lille-Kortrijk-Tournai. In a Flemish context, Roeselare is part of the national urban network Kortrijk-Waregem-Roeselare.

a) Current situation

The current morphology of the area shows a peculiar spatial pattern: village centres at an equal distance from each other and surrounded by a nebula of isolated fragments. This morphological pattern is the result of two opposing networks: an urban network and an agro-industrial network.

On the one hand, the equally spread pattern of villages forms a cohesive urban network. For services and accommodations, the smaller villages in the urban network are strongly focused on the city of Roeselare (Project Stedenbeleid, 2004) which accommodates a larger region.

Due to the lack of another comparably equipped centre in the larger region, the city of Roeselare plays a key role in a cohesive urban network on a regional scale.

On the other hand, the region is an important centre for the food industry in Flanders. Due to the combination of a vegetable market and several vegetable processing industries and cold stores, the agricultural sector has a very competitive position in Europe, compared to other Flemish agricultural regions. The agricultural sector is embedded in a large, internationally oriented network of agro-industry and suppliers.

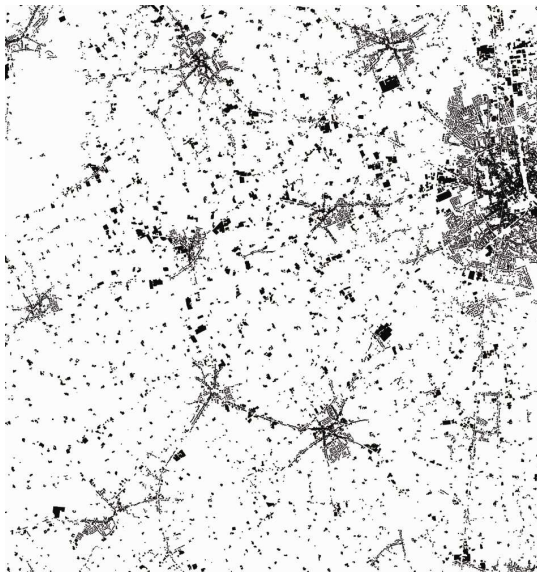


Fig 1 Building morphology

As a whole, the agro-industrial network is extremely productive: with a yearly vegetable crop of 750.000 tons, the region is a top player in the frozen-vegetable industry in Europe. Nearly one third of the European production originates from this region. The processing is controlled by nine, locally embedded companies that are located at a short distance from each other and that are linked through strong family ties. Furthermore, a dense field of suppliers, haulers, greenhouse builders, producers of sowing seeds have arisen around the cold stores. The indirect regional employment measures over 5.000 people.

The overwhelming success of the region is mainly the result of an unusual combination of two elements at a limited area of nearly a dozen square kilometres. On the one hand, the presence of intense economical networks consolidates a reliable income situation for the farmers. On the other hand, the characteristic small-scale management – characterised by a high flexibility – easily adapts to changing market conditions. Both factors, smallness of scale and networking – have to be considered in a historical perspective.

Basically, the soil structure in the West-Flanders region was traditionally very fertile and as a consequence large-scale cultivation was unnecessary.² Moreover, policy was historically characterised by an ultra-liberal entrepreneurship, known as ‘West-Flemish particularism’³, what created the opportunity for each entrepreneur to expand in unlimitedly on its own lot.

The combination of smallness of scale and networking made the traditional agricultural system evolve from a self-sufficient system at a local scale to a complex chain of subcontracting, production and outlet at an international level. Ruthless competition made every entrepreneur find his own way to the market ... a dynamic economical field has developed characterised to a large extent by specialisation.

After 50 years of unlimited growth, the spatial result is astonishing: as much as 60% of the present companies are located outside industrial estates, which means that the ‘countryside’ is more industrialised than the centres. The effect of this evolution on the landscape structure is devastating: a chaos of giant cold stores, piggeries, glasshouses and hangars pops up in the small-scale patchwork of vegetable beds.

The region as a whole can be seen as a diffuse industrial estate at a very low density with high flexibility and dynamics at the level of each individual pixel.

b) Problems

The current landscape seems to lack any structure. Besides a purely aesthetic problem, developments have led to unforeseen problems reaching across the regional borders. Today, the unrestrained developments on private plots have an indirect impact beyond the borders of the plot and limit other entrepreneurs in their potential development. The basis of the problem is a conflict of high and low dynamic processes at different levels. In order to clearly understand the impact of these processes, the spatial conditions of the international agricultural network have to be confronted with those of the local urban network.

On the one hand, the agricultural network is a high dynamic network of internal and external relations at a local and international level. The network imposes specific conditions on its

² The internal structure of the traditional agricultural system consisted of a self-sufficient system at the scale of the individual lot. The base of the agricultural system was formed by an ideal symbiosis between arable farming and cattle-breeding. Because of the self-sufficiency, collective fields weren’t necessary and the entire area was cultivated into a delicately spread landscape of individual parcels with a very high productivity.

³ This policy boils down to allowing or stimulating any form of private initiative on privately owned plots of land. The importance of the private initiative is valued above that of the general public. Governmental influence is minimal. West- Flemish particularism is a social reality, found throughout varying visions on policy.

environment concerning transport, environmental control and water provision. On the other hand, the urban network is a low dynamic network of extensive commuting relations at a local and regional level that imposes totally different conditions on its environment. The fact that both networks are strongly interrelated causes fundamental problems. Moreover, the accumulation of all the private enterprises results in a sequence of problems with a vast impact on the larger environment. The following will briefly elaborate on transport and environmental issues; more attention will be given to the water issue.

Transport

The self-sufficient structure of the traditional agricultural system resulted in logistics at the local level. External interference seemed unnecessary because of the strict application of crop rotation at individual scale. In contrary, the current agricultural network is functioning at an international scale, stretching from the import of cattle fodder over sea to the export of frozen vegetables across the entire European continent by road. Major problem is that the logistics of the current international agricultural system use the same radial pattern of paved roads that forms the structural basis of the logistical network of commuters between villages and city at the local level. The result is very dense traffic as heavily loaded trucks and agricultural vehicles ride through residential areas.

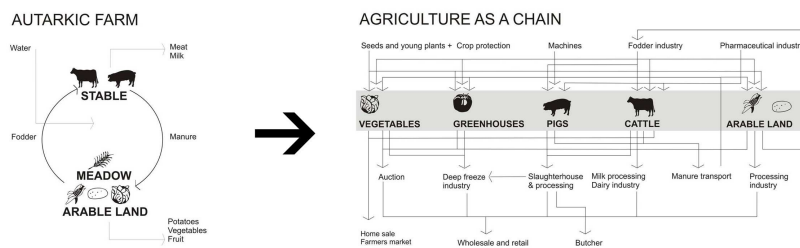


Fig 2 Evolution of the agricultural system

Environmental control

The traditional urbanisation pattern formed a structural part of the agricultural system. The intensification of the land use by agriculture – together with the environmental legislation which posed strict limits and conditions to emissions, radiation and noise – resulted in an extreme increase of the scale of indirect use of space, exceeding the actual limits of the own lot. As a consequence, there is a fundamental conflict between environmentally sensitive

residential functions and farms and agro-industrial activities. On the one hand, the conflict threatens the legal security and continuity of the agricultural sector. On the other hand, environmental problems form a serious obstacle to the expansion of the villages.

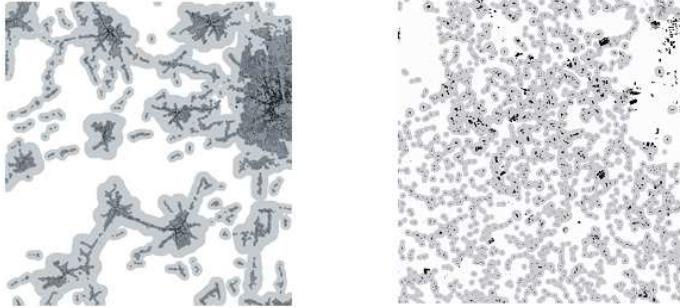


Fig 3 Inward (l) and outward (r) zoning

Water supply

The study area is known for a serious disproportion between the use and the supply of ground water. On the one hand, the very intense use of land by vegetable farms and food industry results in an enormous demand for water. On the other hand, the study area is one of the poorest regions of Flanders concerning water supply.

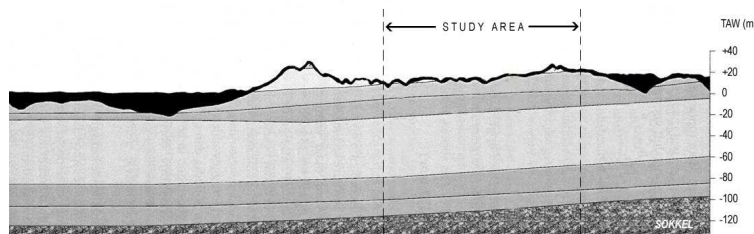


Fig 4 Geological cross-section

Geologically, only a very low quantity of fresh water is available. The topmost sand-loamy soil, which is available to pump up shallow ground water, is only a few meters thick. Underneath lies a layer of Ieperiaan clay, more than one hundred metres thick and unsuitable for water supply because of its massive impermeable structure. Therefore, most industries in the region pump fresh ground water of the deepest aquifers, known as Landeniaan and Sokkel. In particular, the vegetable industry, textile industry and agriculture pump large quantities compared to the supply of the Sokkel. This results in a drastic over-exploitation of the deepest ground water and the decrease of these deepest levels has a much larger impact than just the region itself.

Besides a quantitative problem, the decrease of the water level has a devastating effect on the quality of the deep groundwater. On the one hand, as a result of the contact with air because of the use of pumping-engines, the oxidation of the Sokkel-stones is threatening the water quality. On the other hand, because of the declining counterpressure of the fresh water bubble, the water salinity increases irreversibly.

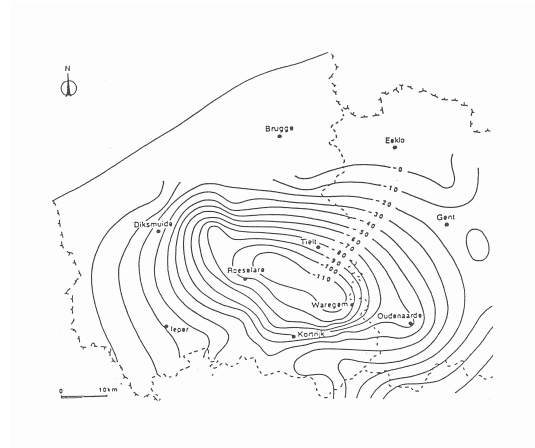


Fig 5 Height of rise of the deep ground water level

Because of the seriousness of the problem, authorities have decided on a 75%-decrease of the allowed extraction of deeper ground water levels within 15 years (GOM West-Vlaanderen, 2004). In the long run, this decision is a threatening factor in further development of those industries directly dependable of the deep ground water. In the region of Roeselare, the cold stores take 20% of the total amount of the deep ground water, the agricultural sector 25% and the textile industry 37%. An important part of the agricultural chain belongs to the large-scale consumption of deep ground water. Although most of the agricultural farms individually have a small consumption of water (about 3500 m³/year), the total sum of individual consumers makes them the largest user. This contrast with the frozen vegetable industry: one third of all the deep water is pumped by only 8 cold stores.

The drastic governmental restrictions on the deeper ground water supply will increase the pressure on the exploitation of shallow water levels which in turn will obviously lead to a spatial conflict between various water-dependending industries and show the importance of co-operation and clustering. As a consequence, this threatening water shortage needs an 'intergraded' water management approach. In the following concepts, the possibility of new alliances between different sectors concerning water management is examined.

c) New approach

The nature and the intensity of the problems, mentioned above, and the processes causing them require a new planning approach. The reason is that, although its large impact on the spatial organisation, the main part of the problem – and of the solution as well – is situated outside the domain of planning. In order to fulfil water demands and the water quota of 2015, a large part of the area will have to be used to store surface water. At the same time, the present problems are an opportunity for introducing new regional dynamics by modelling the spatial implications of the required interferences.

Because a further strengthening of the already strong position of the agricultural sector in Roeselare is seen as a basic principle for preserving the open space in this urbanised region, the aim is to embed agriculture as a vital link in the larger agro-industrial chain. Three structural interventions seem to be necessary and mainly focus on the creation of convenient spatial conditions for the agro-industrial network as well as for the urban network. The strategy is to work critically with separation as well as interrelation of the agro-industrial and the urban network.

The three structural interventions are: the unravelling of conflicting transport networks, knotting complementary water networks and rearranging overlapping environmental boundaries. After discussing the interventions concerning transport and environmental, the concept of water management will be elaborated in detail.

Transport

From a logistical point of view, the transport networks in the region are spatially separated based on their dynamics. The logistical network of high dynamic activities is strictly separated from the local network of village connections by creating an own infrastructural framework.

In practice, the intervention introduces a degradation of the current network of paved roads between the villages to a lower infrastructural category while a selection of local agricultural roads will be upgraded to a higher infrastructural category. Village centres will become junctions in a low dynamic infrastructural network; existing farm-related agro-industrial facilities at a regional scale (slaughterhouses, frozen food industry, fertiliser producers, ...) will become new junctions in a high dynamic infrastructural network. This infrastructural framework catalyses further collective initiatives concerning public utilities such as heat-coupling and sewage treatment.

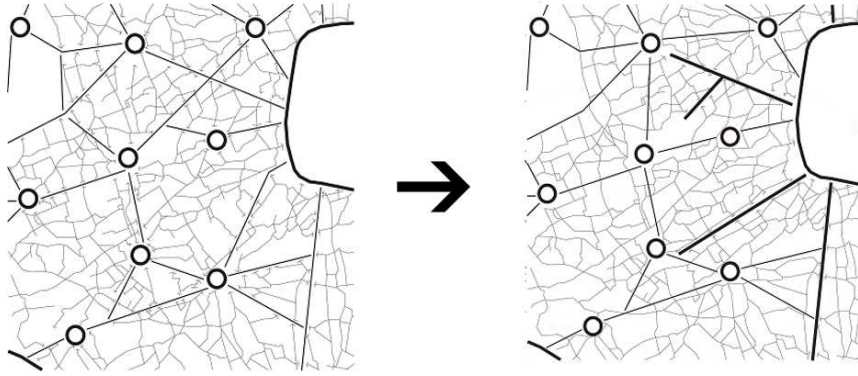


Fig 6 unravelling of conflicting transport networks

Environmental control

Building further on the intervention concerning transport, proposed above, activities are spatially separated based on their environmental impact. Polluting activities will be concentrated around the new framework. A first advantage is that this differentiation in land use, based on fundamental environmental-technical parameters. Secondly, land use will be economised applying the principle of “overlapping sub-zones”. Polluting activities will be located at a further distance from the boundaries of the zone than less polluting activities what allows multiple and more intense land use.

The intervention starts from an extensification of the land use surrounding the village centres and an intensification along the upgraded infrastructural network. Both land uses will no longer obstruct each others expansion. Moreover, a strict application of rules regarding the landscape in the zones along the upgraded infrastructural network will create a new natural framework and landscape structure at a regional level.

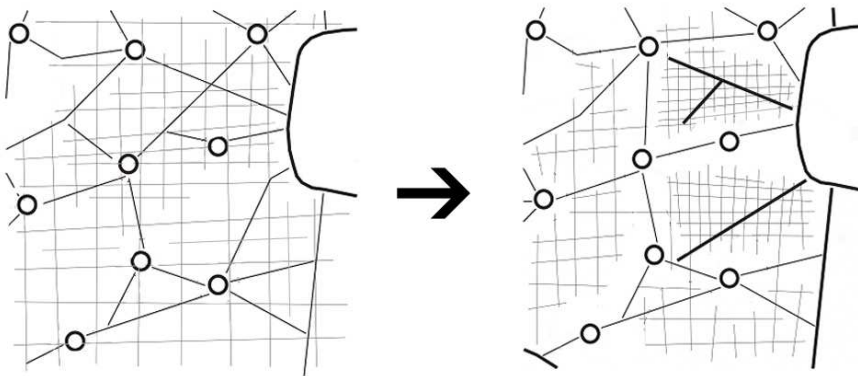


Fig 7 rearranging overlapping environmental boundaries

Water management

Interventions for the water shortage are located at two levels: the level of the plot and the level of the region. At the level of the plot, interventions are focused on environmental-technical regulations, such as the internal re-use of purified water or water saving measures. Because of its high investment grade, only a selective part of the agro-industrial chain can afford this investment individually; small farms often can not. At the level of the region, interventions are focused on the interrelation between companies. The ‘cascade system’, which provides in the re-use of surplus water by neighbouring water-demanding companies, is an example of such an intervention. This category of measures calls for a new structural support, at a scale that is in the middle between the individual plot and the larger region.

On the one hand, an internal interrelation on the basis of their water balance between agro-industrial companies, farms and extended hamlets is introduced. A new structural water network between clustered companies supports the exchange of process water and serves as a structural basis for future agricultural and agro-industrial development. As a consequence, a new structure – which brings unity and structure in the landscape – is added to the chaotic and disorderly settlement pattern.

On the other hand, an external interrelation between the new network of water-dependent activities and the existing sewage network of the villages is introduced. The current sewage and centralised water-treatment model with a central treatment point outside of the territory is transformed into a decentralised system of small-scale water treatment per area. In this way, the water will no longer be collectively drained, but directly linked to the water-demand network of farm-related industrial clusters.

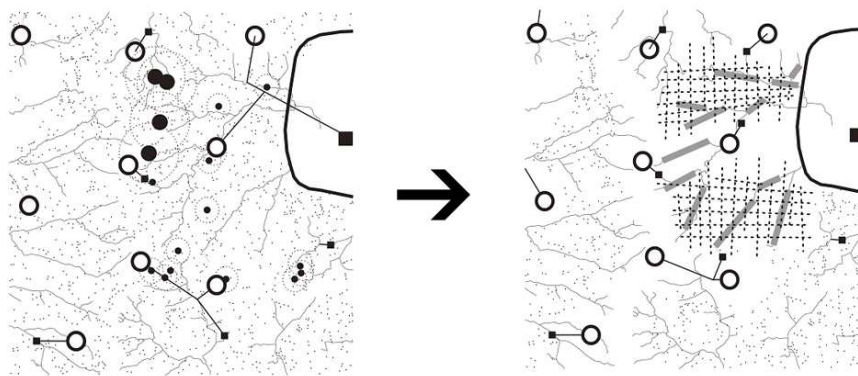


Fig 8 knotting complementary water networks

4. Conclusion

A strong functional relation between city and countryside and a strong coexistence of urban and rural functions and activities on the countryside made the success of agriculture in medieval Flanders. As a result of agricultural modernisation, expansion and specialisation, this coexistence has become a handicap, but the spatial result of the former coexistence – the spatial mix of agriculture and other activities on the countryside – is still present. One of the major challenges in Flemish spatial planning policy for the countryside will be to address this switch in coexistence of activities.

However, to this day planning policy and research is dominated by a planning discourse that considers city and countryside as antipoles. This discourse is however no longer tenable within the concept of network society. This paper discussed three alternative planning discourses about the relationship between city and countryside which try to meet the characteristics of network society in a different way: city and countryside as networks of activities, as systems of places and as ecosystems.

Because of the size of current water issues in the countryside, each of these discourses focuses on water management: as the main structuring principle in the ecosystem discourse, as an identity builder in the systems-of-places discourse or as an element of selective weaving of urban and agro-industrial water networks in the network-of-activities discourse. In these three discourses, water management is not a separate sector nor divided over different policy sectors. Water management concepts are integrated in an overall vision on how urban and rural functions and activities in the countryside should interrelate. Instead of an ex-post evaluation of water-related measures in plans, this kind of planning approaches seems to guarantee a more efficient and embedded water management.

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