



Intermediary report - January 2003

**DEVELOPMENT STRATEGIES FOR A
MULTIFUNCTIONAL AGRICULTURE
IN PERI-URBAN AREAS
CP-18**

RUG - KUL

SPSD II



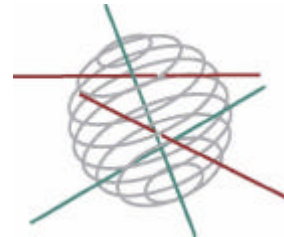
PART 1

SUSTAINABLE PRODUCTION AND CONSUMPTION PATTERNS

-  GENERAL ISSUES
-  AGRO-FOOD
-  ENERGY
-  TRANSPORT

This research project is realised within the framework of the Scientific support plan for a sustainable development policy (SPSD II)

Part I “Sustainable production and consumption patterns”



The appendixes to this report are available at :
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1. Project Title

Development Strategies for a Multifunctional Agriculture in Peri-urban Areas

2. Introduction

2.1. Context and Summary

The rural area in densely populated parts of Western Europe is clearly characterised by its urban character. The resulting influence on the agricultural sector is felt strongly through a growing population pressure on the open area, new and more stringent environmental measures and a heavier regulation of spatial planning (Goetgeluk and Schotten, 2000).

On the other hand, the local agricultural activities play a paramount role in the maintenance of landscapes, the socio-economic viability of a region, highly valued ecological and other functions (Maier and Shobayashi, 2001). Therefore it is important to safeguard the survival of these farms in these areas. Previous research has demonstrated that the economic viability of these farms is seriously threatened by an insufficient income generating potential (Van Hecke, 1999). Apart from this economic viability, farming activities must also enable the farm household to continue their activities in a socially and ecologically sustainable way.

This research project wants to study the possible development strategies, like the diversification of activities, on farms to fulfil their multifunctional role implied by the expectations of citizens and consumers, while safeguarding the economic, social and ecological sustainability of their activities.

2.2. Objectives

A number of important characteristics for the specific situation of agriculture in an urbanised area, are studied.

An analysis of urban and more rural environments will be executed. Based on the historical role and evolution of Belgian agriculture and on international theoretical and empirical studies will then be investigated which functions are fulfilled by this (sub)urban agriculture and how social expectations and the demand for agricultural functions have evolved in time.

In a second research phase is investigated to what extent current agriculture is fulfilling these functions, and if these functions are strictly connected to agriculture or if there exists a competition with other providers of these desired functions.

A range of research tools will investigate which changes can be made on existing farms in order to adapt to these new requirements of other inhabitants and the broader society, and even turn these adaptations into new competitive advantages, ensuring the eventual survival of the farm business.

The different factors putting pressure on the farm income are identified. Starting from these pressures on the one hand and from the new challenges and possibilities offered by the increased demand for new functions on the other hand, new possible strategies for farmers will be selected, supporting the farm household income in a sustainable way.

In addition, existing and possible policy initiatives will be evaluated with regard to their efficiency and efficacy, and their compatibility with new expectations towards agriculture in this context. The European, integrated and region-based rural development policy can impose competitive disadvantages for farms situated in urban regions. Enforced and necessary environmental measures can also seriously threaten the sustainable exploitation of agricultural enterprises in an urbanised area. These limitations can nevertheless be a new source of inspiration, resulting in enhanced innovative potential and quick adaptations of these farmers (Beauchesne and Bryant, 1999). Therefore, the way specific policy can ensure the possibilities for innovative initiatives is also investigated in this project.

2.3. *Expected Outcomes*

Three groups of results can be expected from this project:

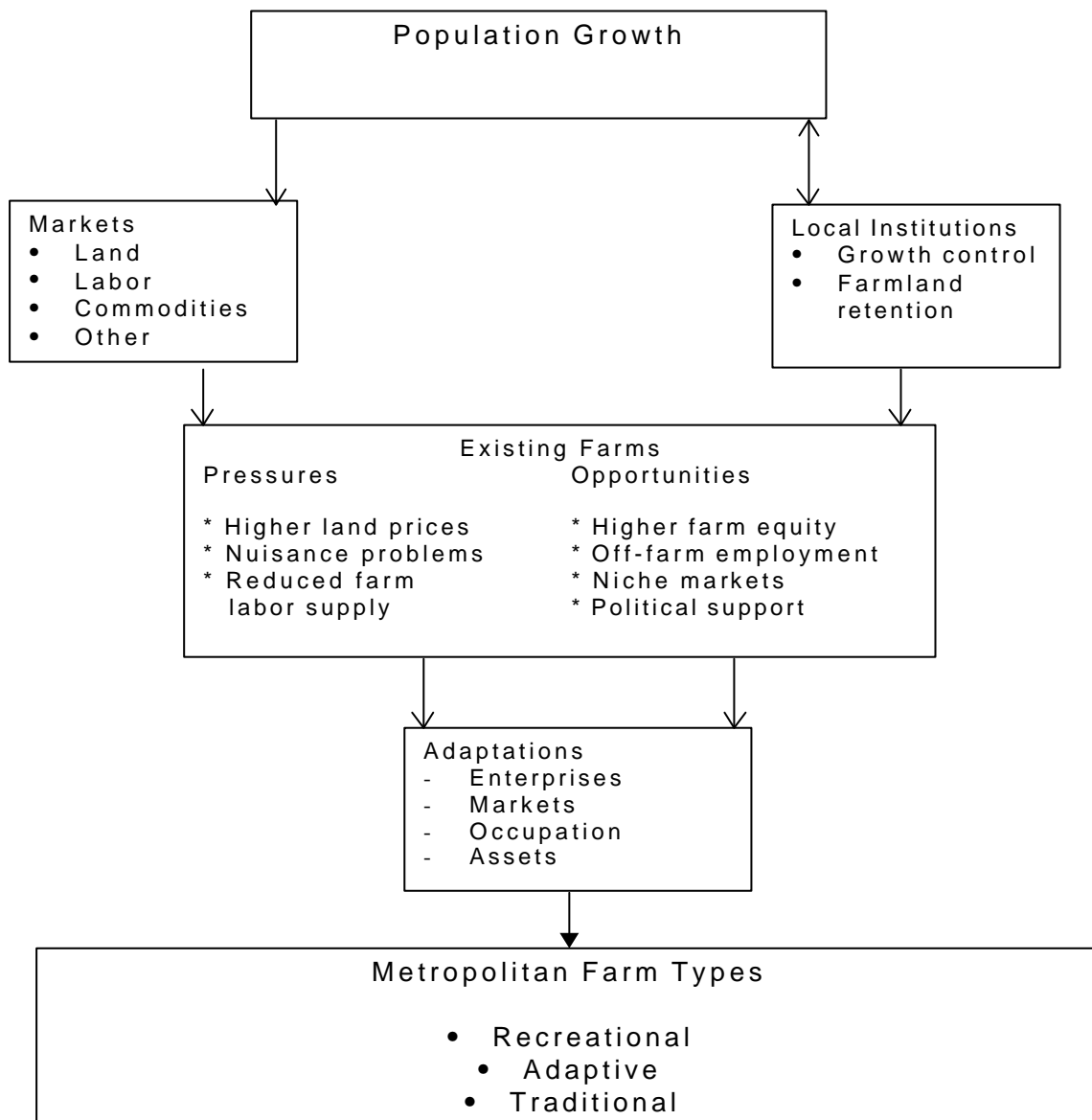
- a. An enhanced understanding of and an integral view on the specific problems faced by agriculture in peri-urban areas. Very few researches have been executed in this field previously.
- b. The identification of possible innovative and applicable survival strategies within the agro-food chain in urban areas. The possibilities to valorise non-marketable outputs and new marketable functions, taking into account the growing concerns of society and consumers, is stressed in particular, as well as the safeguarding of the economic, social and ecological sustainability of these activities.
- c. A thorough understanding of factors influencing the development of coordinative mechanisms with respect to multifunctional agriculture and an evaluation of possible and current policy. This will result in a number of policy recommendations for agricultural development in peri-urban areas, based on market environments, public redistributive mechanisms and communal reciprocity.

3. Detailed Description of the Scientific Methodology

3.1. General Framework

The study of the agricultural development in peri-urban areas is situated in the framework proposed by Heimlich and Barnard (1997). It shows how, starting from increased population pressure, agriculture is forced to choose a specific development path in a rapidly changing environment (Figure 1)

Figure 1. Adaptation of Agriculture enterprises in the urban fringe (Heimlich and Barnard, 1997)



This framework includes three very broad development forms of enterprises: recreational, adaptive or traditional farms. Other authors (Bowler, 1992; Ilbery, 1992) distinguish more particular development paths.

By evolving towards new farm structures, agriculture increasingly has to deal with the new demands for multifunctional forms of agriculture. In the process of this evolution, we can

distinguish 4 different aspects constituting a basic structure for this research and linked to the main hypotheses (see 4.1.5.):

- Function expectations from the broader society, from consumers or specific stakeholders;
- Fulfilment of functions by their different possible providers ;
- Realisation of functions by agricultural enterprises, within the marginal conditions imposed by the peri-urban environment ;
- Support of functions by policy measures or other structural initiatives ;

3.2. Detailed methodology

Different steps in the project can be identified and are approached with selected scientific methods.

In a first step, a *literature-based study* will be executed in order to:

- gain a clear understanding of the historical evolution, the functions of agriculture and their relation with broader social evolutions ;
- establish a theoretical framework based on existing approaches of multifunctionality and supportive empirical indications from related studies ;
- reveal underlying mechanisms and problems or threats towards agriculture in an urban context ;
- collect significant variables, research methods and comparable results providing a basis for the elaboration of the following methods and the selection of the study area(s) ;
- Concretising the research objectives into specific hypotheses and research questions.

A next step is the *delineation of the study area*. To obtain an overview of the spatial structure of Belgium we have executed a cluster analysis on a combination of agricultural and spatial characteristics. Based on this clustering we have chosen to focus our research on the central urban area in Belgium, forming an empirical basis for the execution of interviews in the next phase.

A third step is the execution of *interviews and/or surveys* with citizens/consumers as well as with farmers in the selected areas. In this way, both the demand and supply side of multifunctionality can be taken into account.

The surveys, in-depth interviews or case studies (depending on the specific nature of the research question) are always preceded by interviews with key persons, local authorities and sectoral stakeholders, in order to balance and complete the topic lists. Surveys are executed on a sufficiently large scale, in order to enable a certain degree of generalisation of the results.

In a fourth step, the results from this field research are *analysed in different ways*:

- a SWOT-analysis for agriculture in urban areas ;
- statistical testing of the formulated hypotheses ;
- correspondence analysis, identification of possible relationships between respondent characteristics and their expectations and actions.

In a fifth step some *case studies* will be selected with successful innovative and other survival strategies. The significant aspects and coordinative mechanisms concerning markets, public redistribution and communal reciprocity (Meert et Al., 2001) will be identified in detail. The role of particular actors in the (socio-economic) network of the farm will be highlighted.

In the final step the *current policies* applicable to agriculture in these areas are analysed and compared to the results from the sectoral surveys and the case studies. The conclusions will be used to formulate adjustments of these policies and recommendations for new and specific policy measures.

4. Detailed Description of the Intermediary Results, Preliminary Conclusions and Recommendations

4.1. Theoretical framework

4.1.1. Historical evolutions and social expectations towards agriculture

Between 1750 and 2002, the development of agriculture has shown parallel movements with the evolution in the broader society (Dejongh, 1999). It is good to linger over processes from the past before analysing the current tendencies and developments that affect the rural space. The result is a model that makes a distinction between three phases in the agrarian transition of the rural space starting from a spatial and a chronological perspective (Marsden, 1995; Meert, 2002).

The model relies on the assumption that rural space, including references to agrarian activities, is a social product, embedded in the interaction between macro-social processes and individual, small-scale practices. D. Massey's geological metaphor is a central concept to theorise these mutual relations between space, the macro and the micro dimension of society. In her pioneering work (1979 and 1984), Massey understands regional economic inequalities as the result of successive waves of investment. Comparable to geological sediments caused by important and large-scale geological processes, these economic activities are deposited on a surface and every sedimentary layer is corresponding with changes in general production processes. In our research project, the rural landscape is also seen as a social product, which reflects the interaction between different social-economic processes and household practices, including elements of social conflicts and struggle. This interaction took place over several distinct periods and each period is characterised by a specific social-economic and spatial logic. Some of these spatial outcomes will have a relatively inert character and can be identified on different scales, i.e. the national or the regional level (Meert 2002). This way it becomes clear that the sedimented layers contain different elements (such as the presence of ecological relicts or the tradition of accommodating visitors on the farm), that can hinder or conversely facilitate e.g. a successful reorientation of a farm towards new demands on the food market or, more broadly, towards

different forms of farm diversification. By using this metaphor in a non-deterministic way, we will assess the dialectical relations between space, social networks, farm strategies, consumer attitudes and macro social processes of rural economic restructuring. Based on empirical research (e.g. by Dejongh 1999), we distinguish three major different agricultural stages in the formation of the present rural landscapes. Each period corresponds to a type of space. These spaces reflect always the inherent social conflicts and to some extent, these conflicts are also reproduced through time.

The first period runs up to the Second World War. Farms are characterised by polyculture and are small-scaled with a relative high degree of self-supporting. Agriculture was an important, but vulnerable (due to uncertain natural conditions) economic actor. The landscape is still characterised by a lot of small landscape components. We call this type of landscape 'nostalgic' if it occurs to this day. A second period took place after the Second World War. This period fulfils the purpose to organise a self-supporting agriculture in Europe, which led to an enormous scaling-up of the farms, based on technological financial innovations. Due to this large-scale cultivation of the 'land consolidated' parcels, a lot of the small landscape components disappeared. Landscapes present a 'high-productivistic' character. European agriculture policy provided a high degree of protectionism in order to assure food security, while the externalities of these mechanisms gradually became more visible: production surpluses, environmental damage (such as shrinking biodiversity) and new threats for food safety (with recent food crises as perfect examples). This points to the fact that quantity and quality are not always corresponding. The most recent evolution in agriculture has been catalysed by international agreements and discussions: agriculture can only guarantee its own future by developing in a sustainable way. Good agricultural practice should combine long-term economic efficiency taking into account social and ecological implications for the next generations. Putting these considerations into practice, these results in new farming styles, diversification, integration and alternative forms of agriculture. The newest landscape is one modelled to size of new consumption interests. It is utmost 'consumable' because of the scenically and ecological interweaving of divers functions.

This macro-geographical interpretation of producing new agricultural spaces will be detailed in our research at the level of the case-studies. This means that a detailed analysis of the social-historical production of each setting, including both materialistic (such as typical crops) and non-materialistic elements (such as traditions), will be analysed in relation to current chances and difficulties regarding diversification strategies of the farms and the aims and attitudes of consumers vis-à-vis farming.

The above mentioned model of spatial-agrarian transition is based on three underlying macro-social transitions: an administrative, an economic level and a social transition.

First of all the administrative transition. Since the development of Common Agriculture Policy, the margin to act of the national governments decreases in favour of the decisions made by on European level (top-down). The development and the current situation of agriculture in Belgium are inextricably bound up with the development of the Common Agriculture Policy (CAP). The original objectives of the CAP were among other things an increase in production, stabilisation of the market and safeguarding the food supply. The common market regulations for the most products existed of a system of guaranteed market prices in combination with export subsidies. After successive reforms of the CAP, it took until 1985 before themes such as environmental effects and food quality got a chance. Like this the concept of 'sustainable agriculture' came up. New evolutions forced the Union into implementing more radical measures, which resulted in Agenda 2000 (European Communities, 1995-2002). One of those objectives is the development of the rural space. Thanks to this policy a new transition happens with a shift in power and policy from a strong European strategy/weak national framework to a strong national and regional framework (bottom-up). Together with the further reduction of the market support, this all leads to the transition from mass production to consumption care.

In the second place there is the economic transition. The decrease of the world market prices has determined the reforms of the CAP. Thanks to the partial compensation through direct subsidies the reforms have a more moderated effect on the Belgian agriculture. Arable farming has faced difficulties the most. In the late nineties, consecutive food crises caused a drop in meat consumption, lowering producer prices for beef with another 25 to 30%. Dairy farming could maintain itself thanks to the price mechanism. The Walloon provinces in Belgium with their arable farming and cattle breeding are the most dependent on the CAP. Pig farming and horticulture in Flanders are not dependent on the CAP but the international competition has become a major determinant for their income. Small production surpluses immediately lead to price fluctuations. These sectors are capital-intensive with a high use of intermediary inputs. The income is just a small part of the production value and therefore is more vulnerable.

Conversion from one subsector to another or from one production to another isn't obvious. The market for organic products is quite limited. Often diversification, inside or outside the farm, becomes a necessity.

Like any other economic sector, agriculture is dealing with increased and changed expectations from society. According to Martens (1999), the confrontation with these expectations is strongly felt by agriculture due to its nature as a basic food producer and to its clearly visible claims on the open space. In his opinion the expectations towards agriculture are strongly dependent on the status of the concerned citizen and the social groups he belongs to. As a consumer, he stresses the importance of a sufficient amount of food of satisfying quality. As an inhabitant living in the neighbourhood of any farming activity, the

participation in social networks is still valued but the direct confrontation with negative aspects is gaining more importance as well. The presence of physical pollution, industrial buildings or even unpleasant smells released from the farm can be the cause of a negative image of modern agriculture or some of its aspects. The recreational consumer of the open space and the rural environment, values the landscape highly and appreciates agriculture for its role in maintaining this landscape and its natural shape. Agriculture in peri-urban environments is continuously confronted with these three aspects of the non-agrarian citizen. All of them are eventually consumers of certain agricultural products, so on the one hand 'urban' farms clearly feel the pressure of concerns of the near inhabitants, on the other hand many urban citizens spend part of their leisure time in the open space near the city centre. Marsden (1995) says that in the rural areas of Britain in the nineties, 'exchange agents' (including such people as estate agents, planning consultants and solicitors) are at the 'sharp end' of the commodization of rural land and good and services. According to him the extension of diverse consumption interests ensures increased local contestation over change and burgeoning responsibilities for regulatory agencies (e.g. the local planning system). These new consumption interests in land may become a more powerful force if established agricultural land markets continue to falter and amenity interests continue to diversify (Geisler, 1994). Some of these new consumption concerns have re-emerged out of a deep-rooted concern for rural amenity that surfaced in the nineteenth century. New versions of this are now expressed in the wake of the post-war consensus for agricultural production. One expression is the growing demarcation of rural space for protection and amenity, which goes beyond national park designations.

4.1.2. The situation of peri-urban agriculture

Belgian agriculture is currently confronted with a difficult economic situation caused by a mixture of evolutions during the previous decade (see the economic transition).

On the other hand, prices of production factors have been rising spectacularly. In particular the price of agricultural land has remarkably increased (Lauwers and Overloop, 2001) due to the growing policy demand for land-related meat production systems and more extensive cattle production (based on European regulations).

The spatial situation of the Belgian farmers is a good example of general tendencies observed by several other Western researchers (Bryant, 1992, Caalders et Al., 2000). Where rural and urban areas were once clearly separated, they've undergone compression both in space and in time. Urban values and ways of life have been adopted by the rural population, and the rural area itself is increasingly absorbed by the urban society (Driessen et Al., 1995 and Pahl, 1966). The advantages of cities, including employment, culture and availability of markets, is nowadays combined with the need for a green, but easily reachable open environment.

While suburbanisation has alienated the urban citizen from its cities, the same holds true for the farmer and the countryside. There too, spatial and economic organisation has been dictated by the rationale of the economic management. This led to a situation where all available open space, even in more densely populated areas, has been used for productive purposes. In recent years however, this productive area is again evolving towards a consumer-oriented space. Other and new functions are taken in account and spatial organisation operates within a framework of nature conservation, environmental concerns and cultural and recreational needs.

These evolutions turned the peri-urban environment into a meeting point of interests of a diversity of interest groups (Van Hecke, 1988). These interest groups each have their specific claims on the available space (table 1)

Table 1. Examples of claims on peri-urban space by four important interest groups (Reheul et Al., 1999)

Agriculture	Nature / Environment	Peri-urban inhabitants	Consumers
<ul style="list-style-type: none"> • Sufficient amount of productive space • Security about the future use of space • Compensations for the value added by agriculture 	<ul style="list-style-type: none"> • Avoiding fragmentation of areas • Securing sufficient space for viable ecosystems 	<ul style="list-style-type: none"> • Attention for the quality and quantity of the typical landscape 	<ul style="list-style-type: none"> • Recreational possibilities • Places with clean air, clear water, valuable landscapes and silence

Another important aspect is the presence of a larger and more active labour market. Job opportunities are easier accessible even for less educated farmers. This results in an increased pace of outflow from agriculture. Younger farmers on smaller sized farms tend to be the first to abandon their business, leaving behind an older farm population on insufficiently modernised farms.

This labour market however can also create opportunities for farms to supplement the farm income with income(s) from outside agriculture, and by doing so preserving the farming activities (Meert et al., 2002). Another positive opportunity for the development of agriculture is the overall better infrastructure and the nearness to the consumer. These and other opportunities, sometimes depending on the specific region, force a number of farms to adapt their business to the situation. Often alternative products, alternative marketing channels and

forms of new on-farm activities are used to generate sufficient added value and/or income to assure the survival of the farm business (Heimlich and Barnard, 1997).

4.1.3. Multifunctionality as a new opportunity

The increased interest and altered expectations of urban consumers coincides in these peri-urban areas with agriculture's search for solutions to survive the (economic and environmental) squeeze. A possible link between these could be an evolution towards multifunctional enterprises (Van der Ploeg, 1999).

Multifunctionality is defined and discussed by many authors. The most commonly used definition by the OECD mentions two key factors (Maier & Shobayashi, 2001) :

- (I) The existence of multiple 'commodity' and 'non-commodity' outputs commonly produced by agriculture ;
- (II) The fact that some of these 'non-commodity' outputs have the characteristics of externalities or public goods, resulting in badly functioning or non-existing markets for these outputs.

In an earlier OECD-publication (2000) is mentioned that these non-commodity outputs can directly be provided by the fixed inputs (land, capital, family labour) or can indirectly be produced linked with the commodity production, with commercial services provided by the farm or even linked with the farming practices and techniques. This jointness is an important aspect to assess the direct and indirect effects of policies on the provision of the desired functions (Romstadt, 2000). Romstadt and some other authors mention a series of possible multifunctional outputs, and Belletti et Al. (2002) add a distinction between internal and external effects. The outputs mentioned in different studies are compiled in the overview in annex 6.3.

On a regional level, this multifunctional approach can form the basis of the construction of an 'agricultural locality' (Bryant, 2001) in the urban fringe, where synergy effects can result in a positive context for adapted agricultural businesses. These new dynamics are shaped by different components : the different actors in the region ; their interests and beliefs ; the actions they undertake ; social networks ; the current organisation of space ; actual and latent orientations of the area ; cultural, economic, legal and political contexts, etc (see Ray 1998).

A commonly proposed way to stimulate agriculture to evolve from the conventional production patterns towards 'multifunctional' enterprises, is the broadening or deepening of the traditional activities. Various forms of diversification are possible ways to establish this, and Van der Ploeg (1999) even suggests that this might be the only solution for Western European agriculture to overcome the loss of the competitive advantages in the production of traditional crops and animals.

Another argument in favour of this evolution towards diversified farming, is the fact that these enterprises have shown a much more stable income and therefore a more sustainable character (Bryden et Al., 1993). A previous study on income problems and diversification

(Bourgeois et Al., 2001) already suggested that survival of individual farms was closely connected to the broadening of activities by household members.

These arguments are also clearly understood in European policy, where the promotion of on-farm diversification is embedded in rural development plans of many regions. The second pillar of the CAP explicitly recognises farmers as the stewards of the countryside's natural resources. In the light of the ongoing WTO discussion, the multifunctional role of agriculture is a new and popular argument for renewed protection of domestic producers (Burrell, 2001). For that reason, local policy is expected to use this aspect in the development of new specific measures.

4.1.4. Main working hypotheses

The main hypotheses to be tested are grouped around four aspects of multifunctionality and their application in peri-urban areas : the expected functions, the current fulfilment of functions, the potential realisation of functions and the support of functions.

Inhabitants of the peri-urban area are no longer mere consumers of food and fibre, but more and more consciously expect new and better functions from agriculture. A first main hypothesis to be tested is :

H1 : The expectations of society towards agriculture reach far beyond the traditional agricultural production and include many non-marketable functions

Social evolutions and economic realities in markets lead to a bigger stress and appreciation of these functions. It is worthwhile to explore the extent in which agricultural enterprises already fulfil those functions and the contribution of agriculture to the general viability of an urbanised area. Our second hypothesis is :

H2 : The quickly changing social expectations create new opportunities, but also new threats for agriculture in the peri-urban area.

From theories as well as case studies is demonstrated that farmers actively adapt their activities to the specific situation through a range of development paths and strategies. Population pressure and other factors in the near environment push the individual farmer towards an exploration of new possibilities. Our third hypothesis is dealing with this.

H3 : As a result of pressures on the agricultural sector in general and increasing threats from within the urban area, many farms are forced to develop new and innovative activities to ensure their economic viability

A specific policy may be needed to catalyse these evolutions. A well-balanced and targeted policy should combine an integral vision with sustainability considerations and the preferences of consumers and citizens. This is translated into a fourth hypothesis.

H4 : Departing from the concrete needs and expectations from society and the possibilities of agriculture, local and regional authorities are able to ensure a long-term provision of desired functions by an adapted policy

Each of these main hypotheses can be split up into secondary hypotheses and a number of practical research questions. Each hypothesis is tested for specific study areas within the large selected peri-urban region, depending on the information needed (case studies or surveys ; consumers, citizens or farmers). Therefore the total selected area needs to be sufficiently large to deal with each of these questions.

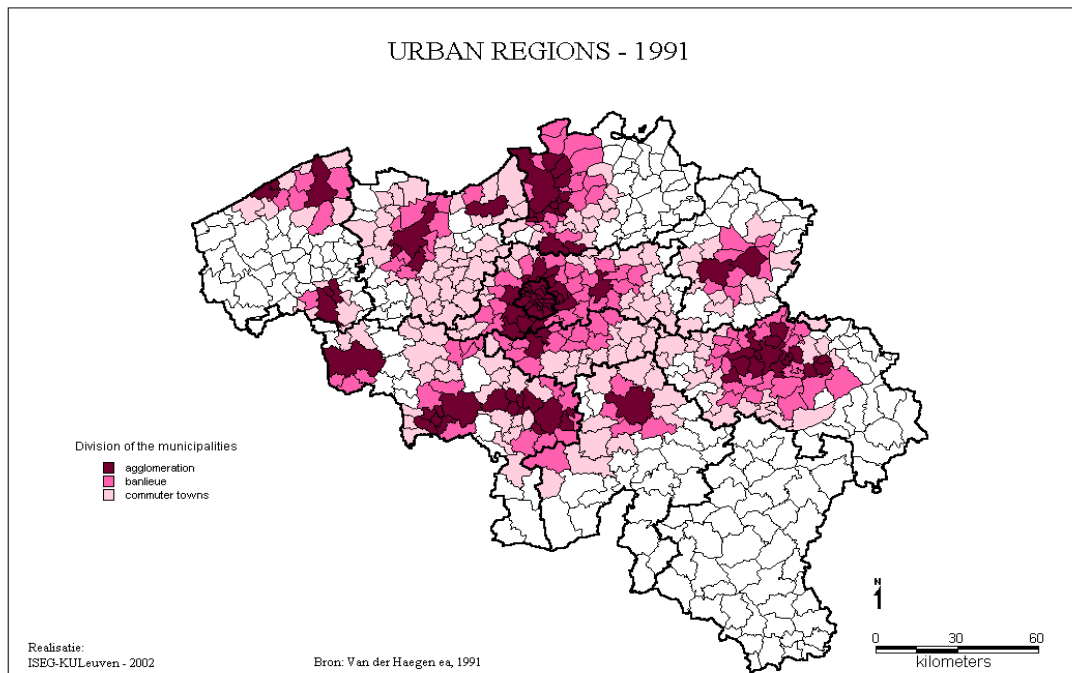
4.2. Selection of the study area

4.2.1. General geographical framework

The hypotheses will be tested in a delimited study area in Belgium. The delineation of the study area is based upon agricultural, environmental and socio-economic features. The urban pressure and urbanisation on one side and the internal dynamics of the agricultural sector on the other side are brought into focus.

Given the post-1945 trends, it is probably no longer appropriate to measure the level of urbanisation simply by the proportion of the population in urban areas. A more appropriate measure of urbanisation might be the common orientation to one or more urban centres (Bryant, 1982). The influence from the city expresses itself in a morphologic and an socio-economic way. In the international literature we find variously terms for the urban area, such as 'city regions', 'urban fields', 'daily urban systems', and 'commuting zones', but the idea is basically the same (Bryant 1982). Friedman (1978, in Driessen, 1995) speaks of an 'urban field' and describes it as "a vast multicentered region having a relatively low density whose form evolves from a finely articulated network of social and economic activities (...).

Map 1: The Urban Regions in Belgium (Van der Haegen ea, 1996)



Throughout history, the Belgian and especially the Flemish scenery has developed towards a succession of smaller and larger cities with only a few remaining rural islands. Urban activities and urban morphology are spread over a larger area than the historical and administrative city's boundaries. The city has become an urban region and this region is divided into an agglomeration (the urban residential area) and a banlieue (the urban periphery) (Van der Haegen, 1979) (map 1). On the one hand we distinguish between the urban regions and on the other hand the remaining municipalities, these contains the commuter towns¹ bordering on the larger urban regions, the regional cities and the rural towns. Peri-urban space consists of the banlieue and the commuter towns (NIS, 1996).

The urban(ised) spatial structure of Belgium is characterised by a rhombus between the major cities Brussels, Ghent, Antwerp and Malines and linear structure from Mons to Liège that follows the Walloon industrial axis. Underneath this spatial arrangement there lies a division in several geographical areas (or landscapes), determined by its physical and biological characteristics and the human activities related with agriculture, industry, business, traffic and residence. In the densely populated areas in Belgium, the agricultural activities are more diverse and less physical (mostly soil characteristics) than human determined and this results in a more complex agricultural typology. Not only the diversity strikes in those peri-urban regions, but also other farming features are different.

Taking the example of farm succession (table 2), this is more insecure in the agglomeration and the banlieue than in the peripheral municipalities.

Table 2. The internal dynamics: Share of farms without a successor or with an uncertain succession in 2001 (Agricultural Census NIS, 2001 and personal incorporation)

province	agglomeration (%)	Banlieue (%)	Other municipalities (%)
Antwerp	82	80	75
West Flanders	72	56	78
East Flanders	69	74	73
Flemish Brabant	(number of farmers too low)	81	77
Walloon Brabant	(number of farmers too low)	63	65
Hainault	65	74	77
Liège	70	76	75
Limburg	63	72	80
Luxembourg			71
Namur	63	80	74

In order to obtain a more meaningful spatial overview we have performed a cluster analysis on a combination of indicators that were regarded as indispensable. A cluster analysis groups observation so that differences in a group are kept to a minimum and differences between groups are maximal. There are two kinds of characteristics used for the cluster analysis (map 2, figure 2 and table 3). First, the characteristics indicating agricultural features, secondly the ones indicating environmental features. We distinguish between three kinds of agricultural variables. The first set are the ones concerning the importance of the agriculture:

- (1) the share of farms per 100 households in 2001,
- (2) the share of farming land (in ha) in the total cadastral area in 2001.

A second set are characteristics concerning the features of the farms:

- (3) the share of occasional farms in the total number of farms in 2000,
- (4) the share of farmers older than 50 years in 2001,
- (5) the average farming area (in are) of the professional farms in 2000,
- (6) Gross Standard Margin/ha farming area in 2001, in UDS1998 (= 5.305 EURO) and
- (7) land (in are) or tenant land in an user's agreement from less than 1 year or other forms of management, in the total leased territory in 2001.

A third set relating the dynamics:

- (8) evolution of the farming area (in are) on the basis of the agricultural count between 1990 and 2001,
- (9) evolution of the farming area (in ha) on the basis of the cadastral count between 1990 and 2001,
- (10) share of the farmers more than 50 years old without a successor or with an insecure succession in 2001 and
- (11) evolution of the number of professional farms between 1990 and 2000.

We distinguish also between three kinds of spatial characteristics namely a first set concerning the population:

¹ The criterion for the delineation of the commuter towns: 'the share of the commuting to the agglomeration regard to the active population living in the town was minimum 15% in 1991 (NIS, 1996)

- (12) the population density (number of inhabitants per km²) in 2000,
 - (13) the mean income, year of assessment 2000, income 1999, in EURO x 1000,
 - (14) the employment in the municipality per 100 inhabitants (RSZ + RSVZ) in 2000
- a second set concerning the space:
- (15) share of the urbanised area (in ha) in the total cadastral area in 2001,
- and a third set dealing with the dynamics:
- (16) the evolution of the population between 1991 and 2000,
 - (17) the migration balance between 1991 and 2000,
 - (18) the evolution of the built area (in ha) between 1990 and 2001.

Map 2: Results of the clusteranalysis

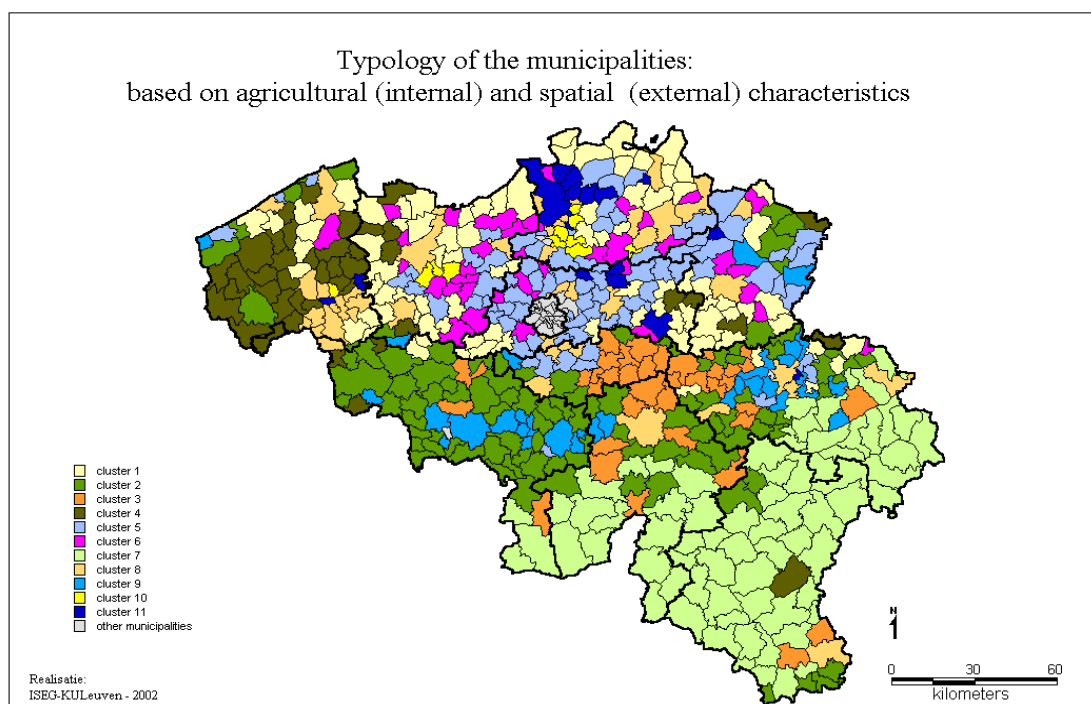


Figure 2: Profiles of the clusters

- number of farms per 100 households
- share agricultural land
- share uncertainly tenant land
- share occasional farms
- mean agricultural land
- share farmers older than 50
- HGS/ha
- uncertain succession
- ev. agr. land acc. the cadaster
- ev. agr. land acc. the agr census
- ev. professional farms
- population density
- mean income
- % employment
- share built-on area
- migration balance
- population evolution

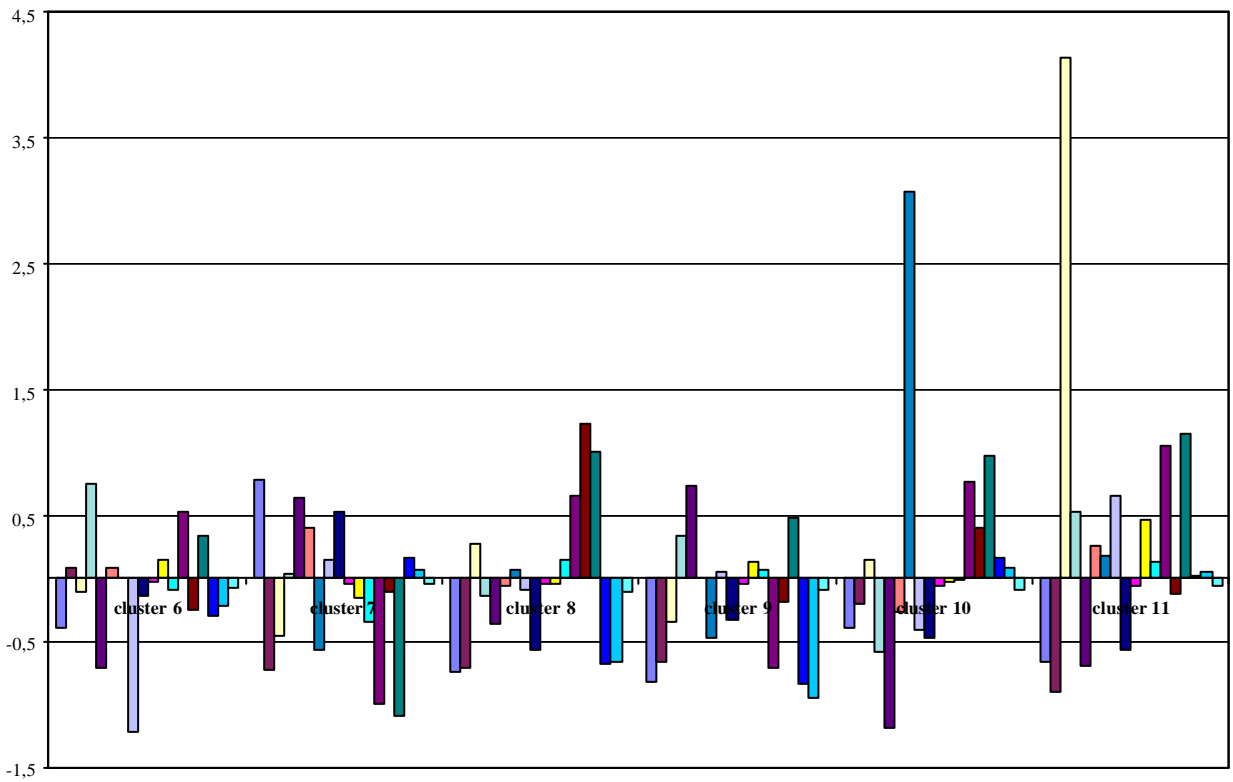
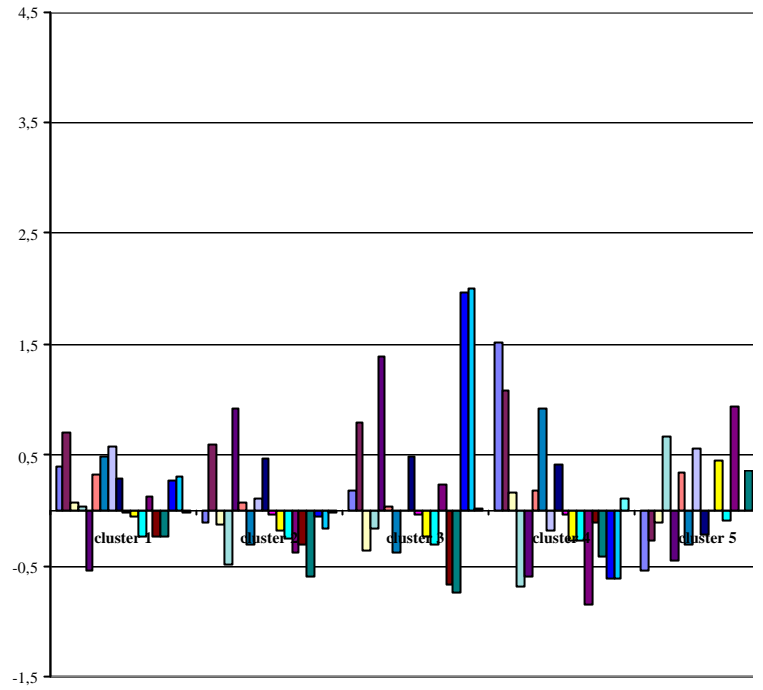


Table 3: A summary and description of the cluster results

Cluster	Description	Spatial distribution	Typology	Number of farms	Share agr. land
Cluster 1	Flemish rural municipalities	Distributed in whole Flanders	Peri-urban, rural area	14678	17,5%
Cluster 2	Large central farms	Loam Region and Condroz	Rural area (Peri-urban)	8746	24,0%
Cluster 3	Recent suburbanisation	Dry Haspengouw (east of the Loam Region of Brabant)	Peri-urban (rural area)	2670	8,7%
Cluster 4	Agricultural municipalities	West of Sandy and Sandloamy Flanders	Rural area	9485	12,2%
Cluster 5	Unstable occasional farms	Pajottenland, Horticulture Region, south of the Kempen	Peri-urban (rural area)	6037	6,9%
Cluster 6	Stable occasional farms	Scattered in whole Flanders	rural area (Peri-urban)	3816	4,0%
Cluster 7	Rural municipalities of the South-east	Fagne-Famenne, Limestone Region, the Ardennes	Rural area	7015	17,7%
Cluster 8	High percentage employment outside the agricultural sector	Scattered in whole Belgium	Urban, peri-urban	3560	4,9%
Cluster 9	Walloon industrial axis	Urban or industrial landscape	Urban	1168	2,6%
Cluster 10	High Intensity (high Gross Standard Margin/ha)	Horticulture Region	Peri-urban	1116	0,6%
Cluster 11	Tenant land in uncertain circumstances	Urban landscape	Urban	725	0,9%

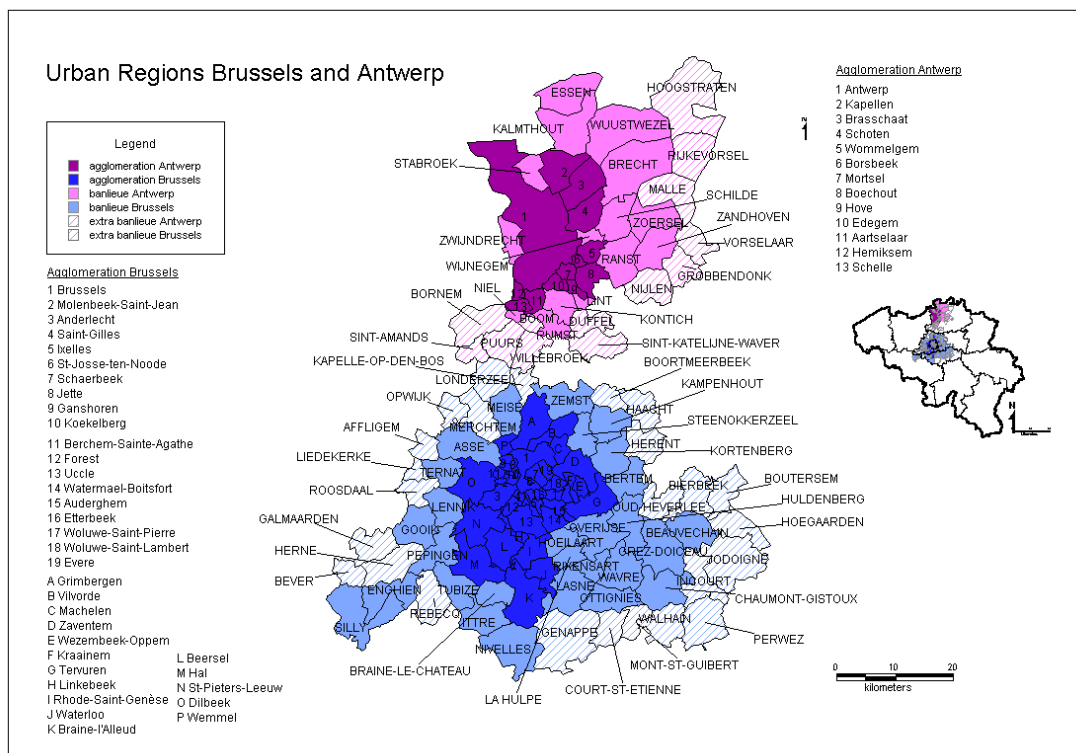
4.2.2. The delineation of the study area

Based on previous clustering, we have chosen to focus our research on the fringe of the urban region of Brussels with the possibility to compare with the urban region of Antwerp (map 3). After an imaginary overlay between the map of the clusters and the map of the urban regions it appears that the urban regions have the same borders as the appearance of a particular cluster.

The agglomeration of Brussels exists mainly of cluster 5 (unstable occasional farms) but still there are some differences between the eastern and the western part of Brussels (map 2 and 3). In the western part of the banlieue, called Pajottenland, occurs also cluster 6 that represents stable occasional farms. At the eastern side of Brussels we find cluster 8 that means a high percentage of employment outside the agriculture sector. So the urban region of Brussels contains at both sides occasional farms except a couple of municipalities in the east. Antwerp knows a different profile, within the south east a lot of intensive horticulture farms in a quite urbanised area and a larger part of typical Flemish rural villages next (or close) to the city. Characteristic features are a relative number of farms and sand-loam farming land with a high intensity the majority of the farmers are older than 50 years and the succession is uncertain. The agglomeration of Antwerp exists mainly of cluster 11, which has a high score for tenant land (figure 2) but in uncertain circumstances.

The classification of the urban regions goes back to 1991 and because of the dynamic of the banlieue we have decided to enlarge the study area with a circle of municipalities around the urban region, without the regional cities like Lier, Malines en Louvain. The extra municipalities are for the main part commuter towns (suburban region), which means that the commuting percentage to the urban region is higher than 15%. It's interesting to consider these municipalities as a part of the outer-urban fringe because of the gradual influence of urbanisation.

Map 3: Delineation of the study area



4.2.3. Current situation of the project

From the literature overview, a general theoretical framework is established, taking into account the aspects concerning peri-urban adaptation as well as possibilities offered by an enhanced interest in the multifunctional outputs of agriculture. Main and secondary hypotheses are derived, allowing for more concrete translation into specific research questions and actions. A series of significant influencing factors and adaptation mechanisms of farms constitute the broad framework for the total project.

The peri-urban area around Antwerp and Brussels is selected as a representative study area, allowing an array of research actions varying from general surveys to specific case studies. The method of data collection will depend on the specific hypotheses to be tested.

5. Future Prospects and Future Planning

At this moment, 2 parallel research steps are prepared and will be executed in the coming 6 months :

- 1) A general survey will be executed among a *representative group of farmers* within the study area. The objective is to get a clear view on the existing types of agriculture, the traditional and new activities on these farms, their economic importance and the functions currently provided by these farms.

The survey is also used to detect possible case studies for the next phase of the project, allowing us to focus on the links between farming activities and the multifunctional outputs.

- 2) Another survey, among *urban and peri-urban inhabitants*, will gain a clear understanding of the social expectations and desired functions from agriculture. The attitude towards agriculture, the value attached to specific outputs from agriculture and the relationship with the respondent's social and living situation are particular points of interest. The information obtained will also be confronted with key persons, representative social groups and professional organisations.

Other provided steps in the following period are :

- case studies with specific attention for alternative on-farm activities, multifunctional outputs and sustainability of specific types of activities ;
- the analysis of existing and possible policy initiatives influencing the provision of desired functions by agriculture ; this aspect will also be approached through in-depth interviews with key persons and specific case studies.

6. Annexes

6.1. References

Beauchesne, A. and Bryant, C. (1999) Agriculture and Innovation in the Urban Fringe : The Case of Organic Farming in Quebec, Canada. *Tijdschrift Economie en Geografie*, 90 (3) 320-328.

Belletti, G., Brunori, G., Marescotti, A., and Rossi, A. (2002) *Multifunctionality and Rural Development : A Multilevel Approach*. Unpublished paper, 23p.

Blomme, J. (1988) *De Economische Ontwikkeling in de Belgische Landbouw 1880-1980 : een Kwantitatieve en Kwalitatieve Analyse*. Doctoral dissertation, Leuven, 323p.

Bourgeois, M., Vernimmen, T., Meert, H., Van Huylenbroeck, G., and Van Hecke E. (2001) *Boeren in de Knel. Een Onderzoek naar de Overlevingsstrategieën van Vlaamse Landbouwersgezinnen*. Wetenschappelijk Eindrapport. King Baudouin Foundation, Brussels, 144p.

Bowler, I. (1992) Sustainable Agriculture as an Alternative Path of Farm Business Development. In : Bowler, I.R., Bryant, C. and Nellis, M.D. (Eds.) *Contemporary Rural Systems in Transition. Volume I: Agriculture and Environment*. CAB International, Wallingford, 237-253.

Bryant, C.R., Russwurm, L.H. & MacLellan, A.G. (1982) *The city's countryside: land and its management in the rural - urban fringe*, London, Longman, 249p.

Bryant, C. and Johnson, T.R.R. (1992) *Agriculture in the City's Countryside*. London, Belhaven Press.

Bryden, J.M., Bell, C., Gilliat, J., Hawkins, E. and MacKinnon, N. (1993) *Farm Household Adjustment in Western Europe 1987-1991*. Final Report on the Research Programme on Farm Structures and Pluriactivity. Commission Of The European Communities, Brussels/Luxemburg, 219p.

Burrell, A. (2001) Multifunctionality and Agricultural Trade Liberalisation. *Tijdschrift voor Sociaal Wetenschappelijk Onderzoek van de Landbouw* 16 (2), 77-95.

Caalders, J., Dietvorst, A. and Philipsen, J. (2000) An Alternative to Standardisation and Conservation in Tourism Development : A Process Approach of Innovation. In : Haartsen, T.,

Groote, P. and Huigen, P.P.P. (Eds.) *Claiming Rural Identities. Dynamics, Contexts, Policies*. Assen, Van Gorcum, 108-116.

Dejongh, G. (1999) *Tussen Immobilititeit en Revolutie. De Economische Ontwikkeling van de Belgische Landbouw in een Eeuw van Transitie 1750-1850*. Doctoral dissertation, Leuven, 387p.

Driessen, P.P., Glasbergen, P., Huigen, P.R.P. and Van den Bergh, H. (1995) *Vernieuwing van het Landelijk gebied. Een Verkenning van Strategieën voor een Gebiedsgerichte Aanpak*. VUGA, 's Gravenhage.

Goegeluk, R. and Schotten, K. (2000) Rural Land Use in Perspectives : The Feasibility of Physical Planning Scenarios. In : Hillebrand, H., Goetgeluk, R. and Hetsen, H. (Eds.) *Plurality and Rurality : the Role of the Countryside in Urbanised Regions, Vol. 1*. Den Haag, LEI, 29-50.

Heimlich, R.E. and Barnard, C.H. (1997) Agricultural Adaptation to Urbanization : Farm Types and Agricultural Sustainability in U.S. Metropolitan Areas. In : Audirac, I. (Ed.) *Rural Sustainable Development in America*. Wiley and Sons, New York, 283-303.

Ilbery, B. (1992) State Assisted Farm Diversification in the United Kingdom. In : Bowler, I.R., Bryant, C. and Nellis, M.D. (Eds.) *Contemporary Rural Systems in Transition. Volume I: Agriculture and Environment*. CAB International, Wallingford, 100-118.

Lauwers, L. and Overloop, S. (2001) *Milieu- en Natuurrapport Vlaanderen*, MIRA. Achtergronddocument 2001. 1.4. Landbouw. Vlaamse Milieumaatschappij, www.vmm.be.

Maier, L. and Shobayashi, M. (2001) *Multifunctionality. Towards an Analytical Framework*. OECD, Paris, 157p.

Martens, A. (1999) *Sociale en Culturele Ontwikkeling van het Platteland vanuit Agrarisch Perspectief*. Tweede Landbouwconferentie voor een Vlaams Plattelandsbeleid, Brussel, March 31, 1999, 31p.

Meert, H., Van Huylenbroeck, G. and Van Hecke, E. (2001) *Analysis of Rural Development Policies Based on Different Modes of Economic Integration*. Paper presented on the 73rd EAAE Seminar 'Policy Experiences With Rural Development in a Diversified Europe', June 28-30, Ancona, Italy, 21p.

Meert, H., Bourgeois, M., Vernimmen, T., Van Huylenbroeck, G. and Van Hecke, E. (2002) *Erop of Eronder. Bestaans(on)zekere boeren en hun overlevingsstrategieën*. King Baudouin Foundation, Brussels, 48p.

Meert, H. (2002) *Het huidige platteland: trends en ontwikkelingen enkele algemene beschouwingen*, Studiedag georganiseerd door vereniging van de Vlaamse Provincies en stichting plattelandsbeleid v.z.w., 8 februari 2002, provinciehuis Antwerpen.

Mérenne, B., Van der Haegen, H. and Van Hecke, E. (1997) *België ruimtelijk doorgelicht*, Het tijdschrift van het gemeentekrediet, kwartaaluitgave 51ste jaar, nr.202, 144p.

NIS (1996) *De Belgische Stadsgewesten 1991*, Statistische Studiën nr. 104, Nationaal Instituut voor de Statistiek, Brussel, 42p.

OECD (2000) *The Production Relationship Underlying Multifunctionality*. Discussion Paper of the Working Party on Agricultural Policies and Markets of the Committee for Agriculture, Paris.

Pahl, R.E. (1966) The Rural-Urban Continuum. *Sociologia Ruralis*, 6, 299-329.

Ray, C. (1998) Culture, Intellectual Property and Territorial Rural Development, *Sociologia Ruralis*, 38 (1), 3-20.

Reheul, D. (1999) *Ecologische en Agrarische Ontwikkeling van het Platteland*. Tweede Landbouwconferentie voor een Vlaams Plattelandsbeleid, Themawerkgroep III, 73-88.

Romstadt, E., Vatn, A., Rorstadt, P.K. and Soyland, V. (2000) *Multifunctional Agriculture. Implications for Policy Design*. NLH, As, 139p.

Schrooten, L. (2000) *Kleine Boeren, Grote Boeren*. Davidsfonds, Leuven, 108p.

Van der Haegen, H. & Pattyn, M. (1979) *De Belgische stadsgewesten*, In: Statistische Studiën, NIS, nr 56, 3-18.

Van der Haegen, H., Van Hecke, E. & Juchtmans, G. (1996) *De Belgische stadsgewesten 1991*. In: Statistische Studiën, NIS, nr 104, 42p.

Van der Ploeg, J.D. (1999) *De Virtuele Boer*. Van Gorcum, Assen, 482p.

Van Hecke, E. (1988) *De Problematiek van de Open Ruimte in de Peri-urbane Gebieden*. Internationaal Seminarie met Betrekking tot de Specifieke Problemen in de Sub-urbane en Peri-urbane Gebieden in de Europese Landen. Oostduinkerke, 20-23/01/1988, 7-40.

Van Hecke, E. (1999) *Boeren in de Knel. Armoede in Land- en Tuinbouw*. King Baudouin Foundation, Brussels, 82p.

6.2. Publications

6.3. Annexes

6.3.1. The multifunctional outputs of agriculture

Table: Non-commodity outputs/functions (framework based on Belletti et al, 2002)

Internal functions	External functions
<ul style="list-style-type: none"> • Living quality • Labour quality • Self esteem • Stress reduction • Appreciation of family labour 	<ul style="list-style-type: none"> • Rural settlement • Product quality • Landscape preservation • Biodiversity • Amenities • Animal welfare • Cultural heritage • Social capital • Knowledge infrastructure • Creation of entrepreneurship • Water management • Soil management • Food security • Food safety • Accessibility of the region • Disclosure of the region