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Review

Multifunctional peri-urban agriculture—A review of societal demands and the provision of goods and services by farming

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ABSTRACT

Peri-urban areas around urban agglomerations in Europe and elsewhere have been subject to agricultural and land use research for the past three decades. The manner in which farming responds to urban pressures, socio-economic changes and development opportunities has been the main focus of examination, with urban demand for rural goods and services representing a driving factor to adapt farming activities in a multifunctional way. Working within the peri-urban framework, this review pays particular attention to the relevance of multifunctional agriculture. Academic discourses and empirical insights related to farm structure and practices beyond conventional agriculture are analysed. Diversification, recreational and environmental farming, landscape management and specialisation, as well as direct marketing are all taken into consideration and discussed within the context of landscape functions. The provision of rural goods and services is contrasted with societal demands on peri-urban agriculture. This review finds that multifunctional agriculture has been commonly recognised in peri-urban areas – a phenomenon that includes a large variety of activities and diversification approaches within the context of environmental, social and economic functions of agriculture. In response to the post-productive, consumption-oriented requirements of the urban society, peri-urban farmers have intensified their uptake of multifunctional activities. Nevertheless, not all multifunctional opportunities are being fully developed when one considers the large and growing urban demand for goods and services provided by agriculture carried out near the city. This paper discusses policy and planning approaches to support multifunctional agriculture in peri-urban areas.

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Contents

Introduction 640
Peri-urban agriculture 640
Objectives and methodology 640
Multifunctional agriculture in peri-urban areas 641
Demands and preferences for multiple goods and services 641
Environmental quality and cultural landscapes 641
Leisure and recreation 642
Regional food supply 642
Multifunctional farming activities 642
Landscape management and agri-environmental production 642
Lifestyle farming 643
Recreation-oriented diversification 643
Social farming 644

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Author's personal copy

Short supply chains and direct marketing 644
Multifunctional development of peri-urban agriculture 644
Policy and planning for a multifunctional peri-urban agriculture 645
Reconnecting urban–rural relationships 645
Zoning, agricultural preservation and urban containment 645
Rural development policy 646
Conclusion 646
Acknowledgements 646
References 646

Introduction

Peri-urban agriculture

Western Europe, among other parts of the world, has experienced a rapid process of urbanisation beyond former city limits over the past few decades. This development comprises physical conversion of open, non-built areas for settlement purposes (EEA, 2006; Thomas et al., 2008) as well as socio-cultural transitions such as the adoption of urban life styles by the rural population, the in-migration of retirees into rural areas neighbouring urban agglomerations, or changes in business structures (Antrop, 2004; Bergstrom, 2005; Busck et al., 2006; Zasda et al., 2010). Although urban growth increasingly takes place on brownfield and infill sites, the conversion of non-built-up areas has occurred almost exclusively at the expense of farmland (Munton, 2009). Productive land and fertile soils are therefore lost, and the number of farms decreases (EEA, 2006; Poppe et al., 2005).

In peri-urban areas, farming has to compete on the land market with other non-agricultural land uses, such as housing with its higher bid rents (Robinson, 2004). As the price for a piece of farmland with an associated building permit rises dramatically, there is a strong financial incentive for farmers to sell land for purposes of urban development. Land speculation is accompanied by expanding shares of non-agricultural owners and common land tenure by producers (Gant et al., 2011). From observations in the UK between 1996 and 2002, Munton (2009) recognised a strong urban impact on the agricultural land market. Land prices rose overproportionally for attractive and accessible land with dwellings. He notes that in the direct urban fringe, there exists various market conditions with much higher land prices, along with a fragmented and complex pattern of ownership and property rights, such as short-term contracts. Aggravating the situation are those shadow markets that form around the expected housing development permissions, which is a development that in turn challenges the traditional landlord-tenant system (Munton, 2009). This increases the influence of the heterogeneous group of land owners who are not farmers of the land they use, as Primdahl (1999) notes.

At the fringes of cities and agglomerations, the high degree of land use transition and conversion for urban purposes as well as the existence of idle and marginal open spaces result in a complex and chaotic mix of heterogeneous land uses, which is how Shoard (2002) characterised the "edgelands" in the UK. In such a landscape, agriculture is exposed to numerous additional pressures and tensions. There is a major build up of litter, wrecks and household waste, even if such refuse is dumped legally (Shoard, 2002; Qviström, 2008). Farming is additionally constrained through the fragmentation of infrastructure, trespassing, widespread vandalism and theft (Catherine Bickmore Associates, 2003) as well as legal issues, such as emission thresholds (Verspecht et al., 2005).

Although marginalised, the delivery of environmental and recreational values by peri-urban agriculture (PUA) has gained importance with the rise of the post-fordist society. Many scholars argue that traditional agricultural functions and values have noticeably been replaced by new non- or post-productive ones, adding a consumption-oriented component to a formerly production-oriented agriculture (Marsden, 1999; Brandt and Vejre, 2004; Luttik and van der Ploeg, 2004). Due to the proximity to urban centres as nuclei of societal and lifestyle transitions, this process provides an opportunity to restructure farming beyond the industrial model based on pure commodity production. Increased standards of living and extended leisure time of urbanites are mirrored by a tendency to purchase regional organic food, spend leisure time in the near countryside, or even to permanently settle down in the countryside around towns. Recreational opportunities, attractive living environments and ecological quality represent soft locational factors, which gain relevance within the international competition of urban regions. Therefore commentators, such as Weber and Seher (2006), argue that multifunctional oriented PUA plays an important role for their provision. A tremendous pressure to adjust agriculture to the modified peri-urban framework conditions has been observed (van Huylenbroeck et al., 2005; Busck et al., 2008). As a result, PUA has been identified as being more diversified, polarised and multifaceted than elsewhere, stressing that this organisation of production contributes to the viability and persistence of agriculture and its societal esteem.

Objectives and methodology

This literature review provides a comprehensive overview and analysis of the existing academic discussion and empirical insights from various peri-urban regions. Going beyond simple examinations on findings of multifunctional farming practices, it methodologically relates them to urban-centred societal valuation and appreciation for agricultural goods and services. Under the premise that the concept of multifunctional agriculture is based on the integrated provision of different goods and services, relevant literature is arranged in groups of functions and services, which are provided by the agricultural landscape and represent the economic, social and environmental dimensions of sustainability.

The following section introduces the theoretical framework for the concept of multifunctionality and how it is applied to peri-urban areas. Sections three and four cover more detailed investigations into multifunctional PUA, focusing on values and functions of landscape, such as environment and landscape, recreational and social issues, short supply chains and direct marketing. Existing research is balanced with results from research on actual urban demands and preferences. This procedure has been chosen to address research questions such as the following: to what extent is multifunctionality a property of PUA? How well do provided goods and services from multifunctional agriculture match urban demands? And finally; which factors and framework conditions enhance or constrain the diversification of farming activities? The last section discusses the relevance and contribution of multifunctional agriculture for sustainable development in peri-urban areas,

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as well as the role and requirements of preservation, supporting policy and planning instruments.

Methodologically, the review is based on an iteratively structured literature survey through the internet databases of 'ScienceDirect', 'ISI Web of Knowledge' and 'Google Scholar'. Combinations of key words related to peri-urban areas; i.e. "urban fringe"; "sprawl"; "urbanisation" and multifunctionality; i.e. "diversification"; "farm tourism"; "landscape management"; have been used for the literature search. Further sources have been found by browsing through more general multifunctionality literature; which also refer to peri-urban areas. The review contains sources on both the theoretical and conceptual background and empirical insights into multifunctional peri-urban farming practices. These include comprehensive statistical analyses and in-depth regional case studies that have been carried out over longer periods of time. The spatial scope of the literature has been geographically limited to research within the European context.

Multifunctional agriculture in peri-urban areas

Driven by output-related subsidies, the European rural countryside in the second half of the 20th century was characterised by mono-functional and intensive production-oriented agriculture. Urban pressures on agriculture and prevalent development potentials presented the main reasons to adapt farming. The multifunctionality paradigm in particular represented a suitable pathway to the development of peri-urban agriculture. As a general definition, and based on the paradigm of sustainable development, the concept has been developed as a framework for rural development to enable agriculture to cope with post-productive challenges (Wiggering et al., 2003). It aims at spatial and temporal integration of land uses and functions beyond traditional food production, with such uses including aesthetical and recreational values, nature conservation or hydrological balance. Enabling the co-existence of different types of land use in a close spatial context, multifunctionality is characterised by synergies, jointness, and a mitigation of conflict situations (Brandt and Vejre, 2004; Gulinck, 2004). Multifunctional agriculture encompasses various strategies and activity fields for farms, such as diversification on and off the farm, specialisation in production and processing, direct marketing or measures in nature and landscape management. Different explanatory approaches have been put forward to analyse multifunctional transitions at farm level. van der Ploeg et al. (2002) focus on rural development trajectories. They distinguish deepening, broadening and re-grounding, depending on whether more value is added per unit, additional activities are started, or more resources are mobilised. Wilson (2007) reflects on multifunctionality as transition processes, whereas Meert et al. (2005) see multifunctional approaches as a farm survival strategy.

Multifunctionality has become a buzzword in research and policy. Wilson (2007) criticises that it suffers from a rather diverse and fuzzy conceptualisation, depending on the field of research, stretching from rural sociology and agricultural economics to geography. Noteworthy is the distinction between multifunctionality from a broader landscape and ecology perspective (Brandt and Vejre, 2004) and the notion of multifunctional agriculture (van Huylenbroeck et al., 2007; Wilson, 2007), which represents the theoretical background for this review. Wilson (2007) distinguishes between more narrow-sensed economistic or policy-based discourses and broader holistic interpretations: the first group draws upon agriculture as economic activity, jointly producing commodity and non-commodity outputs as well as the regulatory framework for a multifunctional pathway. Interlinkages to socio-cultural processes and rural development are reflected by the latter. This idea of linking the positive, supply side and the normative demand side has been described by van Huylenbroeck et al. (2007) as a locally embedded model of agriculture. As it set urban demand and rural supply into a close spatial context, this model attains particular relevancy for peri-urban areas.

During the agricultural crisis of the 1980s, diversification had already been observed in PUA as a survival strategy in rural areas (Ilbery, 1987; Bryant and Johnston, 1992). More recently, in the course of a more comprehensive discussion on multifunctional rural development (van Huylenbroeck et al., 2007; Piorr and Müller, 2009), peri-urban areas have also been subject to multifunctionality research. Nevertheless, the specifics of PUA have not yet received much attention. Only a few research initiatives on a national level (Catherine Bickmore Associates, 2003; van Huylenbroeck et al., 2005; Allaert et al., 2006) have brought the topic onto the academic agenda. However, it has been acknowledged that a multifunctional PUA requires specific attention, since its structures, processes and particularly the interplay with the urban area are not yet fully understood. Allaert et al. (2006: 5) concluded that "if agriculture wants to have a reason for existence in an urbanised society, agriculture no longer can and may be considered as an economic activity sensu stricto." Wilson also points out that elements necessary for what he calls "strong multifunctionality" are particularly evident in peri-urban areas, such as strong non-productivist tendencies including local embeddedness, short supply chains, low farming intensity, a high degree of diversification, and open-minded societies (Wilson, 2007).

Demands and preferences for multiple goods and services

Environmental quality and cultural landscapes

Due to its large spatial extent, agriculture plays a key role in managing the peri-urban landscape and the social, aesthetic and environmental functions of urban agglomerations nearby (Davoudi and Stead, 2007). Depending on the type and intensity of the farming practise, agriculture provides abiotic resources and ecosystem functions for the nearby urban areas. With its high water infiltration rates, pasture and arable land possess capacities for groundwater replenishment (Haase and Nuissl, 2007) and flood control (Kenyon et al., 2008; Wheater and Evans, 2009). Along with forest and wetlands, farmland also contributes to the moderation of urban climate (Lamptey et al., 2005) and carbon sequestration (Freibauer et al., 2004; Hutchinson et al., 2007).

However, the agricultural countryside is also appreciated by society from a visual amenity perspective, as indicated by economic valuation methods such as contingent valuation, choice experiments or willingness-to-pay techniques. In their review, Hall et al. (2004) found that agriculture is recognised as an integral part of the cultural landscape in densely urbanised areas. Bouraoui (2005) could reveal in his studies that agriculture in the eyes of urban beholders represents a supportive element for the countryside's image and surrounding landscape. But along with a general appreciation of agricultural land use, other studies have concluded with a more differentiated picture. Therefore, according to the empirical evidence provided by Fleury (2002) and Buijs et al. (2006), the view of urban visitors on agricultural landscapes has changed from a functional-productive to a hedonic-aesthetic one over the last few decades. Other commentators, such as Thomas (1996) as well as Rode and von Haaren (2005) argue that a homogenously structured and intensively used agriculture does not represent the societal ideal of PUA. Applying visual landscape valuation techniques in Mediterranean case studies, Kaplan et al. (2006) and Arriaza et al. (2004) found that rather heterogeneous and complex

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agricultural land use and cropping patterns with small farms and a high degree of unaltered nature contributes to the amenity value of the agricultural countryside. Also Matsuoka and Kaplan (2008) recognised, in their review of people's needs in the urban landscape, that questioned individuals greatly prefer urban landscapes that are dominated by naturalistic features and elements. Particularly organic farming is highly appreciated by urban residents, as argued by Brink (2003). Surveys among German and Italian urban visitors of peri-urban agricultural landscapes revealed that measures of landscape management, such as hedges and tree rows, afforestation and path networks, were all positively acknowledged (Rode and von Haaren, 2005), whereas the implementation of environmental protection in terms of soil conservation and maintenance of biodiversity was much less valued in another case study (Torquati et al., 2008).

Although there is generally a high appreciation of farmland in the countryside around towns, the visual aspects of the agricultural countryside are prioritised. Its ecological value is less recognised among the public. The urban population prefers landscape amenities derived from a heterogeneous and small-scale farm structure punctuated with natural elements. Although its perception has been transformed lately, agriculture continually represents a major part of the cultural landscape in urbanised areas. However, there is an acceptance of agriculture as an integral land use actor in the peri-urban area. For instance, Bills and Gross (2005) found a high willingness among stakeholders in the agricultural surroundings of London to preserve crop and livestock agriculture as an element in the productive use of landscape, and thus maintain landscape diversity. Similarly, in the Brussels metropolitan region, more than half of the population support the protection of agricultural land use in the peri-urban fringe (Boulanger et al., 2004).

Leisure and recreation

With increasing leisure time, urban dwellers use their surrounding countryside for a multitude of activities. Outdoor recreation has become important for health and quality of life in an urbanised environment (Bell et al., 2007). It contributes to the reconnection of urban population to "the real-world qualities and thus to their own humane essence" as Pedroli et al. (2007: 434) put it. In their review on health effects of visible landscapes, Velarde et al. (2007) conclude that natural landscapes generally have more positive health effects than urbanised ones. Recreational activities require easy access for the potential user. Hence, Antrop (2004) argued that due to their absence in urban centres, in peri-urban surroundings and open spaces, agricultural areas gain importance as leisure areas. Similarly, de Vries et al. (2003) pointed out that the role of agricultural areas for recreation and public health is particularly relevant in highly urbanised regions. Even if agricultural production represents the dominating land use in the peri-urban area, it still provides a "breathing space" for the city nearby (Bryant and Johnston, 1992). In their case study in Northeast England, Sharpley and Vass (2006) confirmed that a demand for touristic attraction existed, as assessed by a high number of day visits in rural areas near urban agglomerations. A survey on urban dwellers in the Brussels region however has shown that only a minority of 24% take advantage of recreation-oriented diversification measures (Boulanger et al., 2004). More commonly, visitors from nearby urban areas use the peri-urban landscape in an informal way by enjoying open space activities. As Agger (2001) argues, agriculture particularly enables activities, such as walking and hunting, although these are not directly provided for on-farm. A strong argumentation provided in the literature at hand is that peri-urban farmland possesses recreational values, which are appreciated by urban dwellers. Recreation and leisure opportunities that contribute to the quality of life are gaining importance. As inner cores of urban regions reach their limitations in complying with the increasing demand in green urban areas, the open spaces around cities, including the farmland, provide valuable potentials to deliver these services and functions.

Regional food supply

Despite the recent orientation away from traditional agriculture, food production remains an important function of PUA. It has been observed that consumers increasingly prefer regional production, particularly for high quality and natural products such as vegetable or ornamental crops (Gilg and Battershill, 1998). Depending on consumer groups and distance to the city, a relevant urban demand has been identified in empirical studies (van Huylenbroeck et al., 2005). Boulanger et al. (2004) found that between 14% of the inner city dwellers of Brussels and 59% of the residents in the peri-urban surrounding have at least once undertaken some kind of direct purchase of regionally produced food, such as from farmers' markets or farm gate purchases. Investigating rural areas in various metropolitan regions, Buciega et al. (2009) associate these reinforced urban–rural relationships with increasing interest of urban consumers in regional agriculture. Similarly, Renting et al. (2003) argue that short supply chains and direct interaction of actors involved in production, processing and distribution also play a significant role in the rural development and diversification process through synergy effects with agri-tourism, natural and landscape management. The locational necessity of agricultural production, namely in its proximity to the central city as described in the classical model by Von Thünen (1826), is experiencing a renaissance with a focus on specialised and high-value products.

Multifunctional farming activities

Landscape management and agri-environmental production

Through its complex interlinkages with landscape, agriculture plays an important role in the production of rural public goods through landscape management. In Europe, farmers are encouraged under agri-environmental schemes (AES) to adopt landscape management practices and environmentally friendly farming procedures that comply with Good Agricultural and Environmental Condition standards. Programmatic priority setting is left to the member countries and differs considerably (Daniel and Perraud, 2009). In general, AES compensate farmers for the deliverance of public goods related to landscape and biodiversity. Farming practices that promote visual amenities, biodiversity, soil and water protection, such as organic farming or extensive grassland management are supported (Cooper et al., 2009). From a peri-urban perspective, AES have been studied and discussed, focussing on the preference of measure adoption, the extent of implementation and the relationships to farming structure. van Huylenbroeck et al. (2005) found in the Brussels urban fringe that landscape management practices are commonly implemented, although farmers' participation rates are higher as their farms' distance to the city increases. In their case study, roughly 23% of farms are involved in some agri-environmental measures, whereas more than 60% participate in landscape measures, such as planting hedges and tree rows. The authors associate the results with land suitability and availability differences. AES in the different countries often aim at broad reach and coverage of farmland (Cooper et al., 2009). Extensive pasture areas, field margins or abandoned land, as well as areas suitable for landscape measures are more common in remote rural areas. Eligibility criteria, such as private ownership, minimum farm

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size and contract duration of the particular measure present other constraining conditions for AES in PUA.

Direct economic benefits are not a major driver for adoption of AES in the PUA. Compensation payments remain marginal when compared to income from food production. However, in the Green Heart area inside the Dutch Randstad metropolitan region for example, 19% of dairy farms are involved in nature management measures, which is a significantly higher number than in the rest of the county (9%) as assessed by Luttik and van der Ploeg (2004). Comparing municipalities across Switzerland, Tobias et al. (2005) also found significantly higher rates for participation in ecological compensation measures among farms near urban agglomerations. Depending on the measure – hedgerow, greenery or pond improvement – up to 23% of landowners in peri-urban Copenhagen are involved in landscape management activities (Busck et al., 2006). Similar to the Dutch case, the authors determined that landowners consider income-related motivation to be less important than nature conservation and provision of recreational opportunities, such as hunting areas. The institutional framework of local and regional policies has been put forward as an important factor to encouragement farmers to participate in environmental programmes or other forms of diversification (Vandermeulen et al., 2006). They conclude that municipal engagement in promotion and support for agri-environmental or landscape measures influences farm behaviour. Others suggest that the dominating farm type affects participation rates in environmental and landscape measures. Part-time (Tobias et al., 2005), lifestyle-oriented (Busck et al., 2006), or innovative and adaptive farmers (van Huylenbroeck et al., 2005) tend to be more active in extensive farming and landscape management practices. Traditional farmers seem to follow a rather conservative strategy that avoids engagement in environmentally oriented practices (van Huylenbroeck et al., 2005). However, knowledge gaps e.g. among holdings that only generate a lower share of income from agriculture, have been identified as general barriers for adoption of AES (Præstholm et al., 2006).

Organic farming represents another approach to environmental oriented farming, which plays a significant role in PUA. Ilbery et al. (1999) found organic production concentrated in urban agglomerations in the UK, whereas in Switzerland it remained a phenomenon of the rural area (Tobias et al., 2005). Especially in the case of mountainous areas, the entry threshold to transform production from traditional to organic farming is comparably low, as management practices require only little changes. There, organic farming is carried out as extensive production, particularly in livestock farming. The authors concluded that such advantageous framework conditions take less effect in urbanised areas. Prevailing natural conditions additionally influence the occurrence of organic farming. Tobias et al. (2005) and Piorr et al. (2006) have shown that it represents a common farming scheme in areas of low soil fertility.

Although landscape management and organic farming have been subject of research in peri-urban areas, the analysed literature above provides only little and inconsistent evidence that farmers in peri-urban locations are more encouraged to participate in environmental and landscape management practices than elsewhere. Both are not a particular property of PUA, but rather are influenced by region. Natural conditions, farm size and structure have been identified as influencing factors for participation. The availability and suitability of the farmland for extensive production can be seen as main obstacles. It is noteworthy that agri-environmental payments are granted on the conditionality of a minimum farm size and land ownership conditions. Farmland is excluded if more than 25% belongs to public authorities. Also, behavioural differences related to farm sizes and farm types need to be taken into consideration. Large holdings, which are rather absent in PUA, possess the necessary farmland capacities to carry out extensive production schemes. Knowledge gaps and administrative transaction costs often hinder participation for small holders. There are numerous obstacles, indicating that AES are not tailored for holdings prevalent in PUA, and instead tend to be part of development and economic viability of remote rural areas. What should be seen as particularly critical, when viewed in light of the urban preference for an amenity-rich farmland, is that PUA is characterised by an underproduction of environmental values and landscape elements.

Lifestyle farming

Lifestyle farming, among which hobby farming is a well-known type, emerged as a result of newcomers of urban origin who purchased farms and discovered the peri-urban agricultural area as a leisure space. The process brings about socio-economic changes among farm-holders and farm structures, i.e. through a withdrawal of crop and livestock production as an economic basis for agriculture. While farmers are either retired or employed elsewhere off-farm, economic production is rarely maintained and strategic decisions neglect economic aspects. They are also limited in durability and stability. A longitudinal study over two decades in the peri-urban area of Copenhagen focussed on socio-economic and agricultural land use transitions, confirming phenomena such as part-time, hobby and retirement farming (Præstholm and Kristensen, 2007; Busck et al., 2008). It showed that full-time farming decreased considerably from 26% to 8% between 1984 and 2003, whereas other farming styles grew according, transforming agricultural land from a production asset to a consumption good as Primdahl (1999) concludes. In contrast, Verspecht et al. (2005) found that in the Brussels region, almost 68% of the farmers are still considered as full-time farmers. However leisure and recreational farming already represent important elements of farming activity in peri-urban areas. Perceived as a recreational activity, production outputs and income generation remain marginal. It has been shown that lifestyle farmers tend to participate more in agri-environmental measures than average farmers (Præstholm et al., 2006). Although it does not represent a much diversified type, recreational farming contributes to farm-diversity on a regional level to which the provision and attraction of additional environmental and recreational functions of landscape are associated.

Recreation-oriented diversification

Farm-based tourism in terms of accommodation and recreational services has been recognised as a major diversification and farm survival strategy that contributes to rural re-vitalisation and development in both rural and peri-urban areas. By providing economic benefits through on-farm activities, or by making use of redundant buildings, it helps to keep farm land in operation (Che, 2007). Using the example of corn labyrinths in German PUA, Lohrberg (2001) highlights the role of innovative diversification to agri-tourism. Although most of the research at hand was conducted within a rural context, some empirical evidence from peri-urban areas confirms that a large share of all diversification measures is related to tourism (Ilbery, 1987; Sharpley and Vass, 2006). For example Jongeneel et al. (2008) found that among other factors, the location in the densely urbanised part of the Netherlands has a significant influence on participation in activities related to tourism. However, farm-based tourism does not represent an intrinsic characteristic of PUA. In general, its prevalence is limited to more rural areas. It is more geographically biased, since it requires the availability of natural amenities, i.e. mountains, forests or water areas. The diversification into farm-tourism and other recreational activities represents a suitable and common opportunity to make use of synergy effects within agri-environmental and

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landscape management measures. Portraying prototypical Dutch farms, Swagemakers and Wiskerke (2004) could show how farms benefit from financial subsidies for agri-environmental measures, in that, once rural amenities and environmental quality have been improved, farm accommodation and direct marketing activities were facilitated.

Horse-keeping represents another example for a major farm diversification activity in peri-urban areas. Empirical case studies from Scotland, Canada and Sweden reveal high increases in stocking-rate gradients in urbanised or urban–rural regions (Quetier and Gordon, 2003; Elgaker and Wilton, 2008). Horse-related landscape transitions referred to as "horsification", which are characterised by changing grazing practices or the dispersion of equine services and bridleways, are rather controversially discussed. For example, some authors focus on the negative impacts from the accommodation facilities and the neighbourhood conflicts with residents (Ravenscroft and Long, 1994; Elgaker and Wilton, 2008). For the equine business, local planners and officials increasingly recognise these issues, and have highlighted the need for integration within a wider discussion of rural development and its impacts on landscape (Bills and Gross, 2005). Other authors like Bailey et al. (2000) have demonstrated that due to the large and increasing demand from urban areas, the provision of equine services represents a relevant income source for peri-urban farmers and a serious land use alternative to conventional commodity production. Elgaker and Wilton (2008) also highlight the particular multifunctional character of horse-keeping, since it provides jointness and synergy effects with other economic and socio-cultural aspects, such as employment or recreational supply. Increasing recognition of PUA as a leisure and recreational space creates demand-conditions for public goods, i.e. amenity landscapes as well as for marketable agricultural commodities. In summary, recreation-oriented diversification opportunities contribute to the economic development process of the countryside near urban centres.

Social farming

Encompassing ideas such as farming for health, green care or care farming, social farming (SF) represents another example of multifunctional PUA. The main idea behind the concept of social farming is the integration of social and health care services into the agricultural activity. The social responsibility of agriculture is strengthened through the provision of different kinds of educational, social and caring functions, as Di Iacovo (2003) defines it. Therefore, production processes are redesigned to include activities like rehabilitation, therapy and education for people with physical and mental disabilities, the socially disadvantaged, children and seniors via their participation in farm-work activities (van Elsen, 2010). Although it is not supported by spatial distribution figures, it has been argued by Siebert et al. (2009) that social farming undertakes valuable social functions, particularly in the proximity to urban agglomerations with their associated density of disadvantaged groups. In contrast, where remoteness represents an inherent part of the therapeutical concept, SF is not exclusively a property of PUA (Di Iacovo and O'Connor, 2009). The first initiatives were established in the 1960s, although the extent of the phenomenon has seen a significant increase relatively recently. It now belongs to the fastest growing means of multifunctional agriculture in Europe (Hassink et al., 2007).

Short supply chains and direct marketing

In the 1970s, farmers did not consider the marketing and sales benefits of being located in the urban proximity (Rettig, 1976). Improved accessibility to local markets, the establishment of alternative or short supply chains and community supported agriculture has been reported more recently in peri-urban farming (Aubry et al., 2008; Jarosz, 2008). The importance of social contacts between producers and consumers, motivation differences among farmers to participate, and the role of different modes of distribution have all been identified as influencing factors for direct marketing (Holloway et al., 2007). This proximity encourages peri-urban farmers to identify market niches, innovate and adapt to new demands, as Le Grand and van Meekeren (2008) could show based on their Dutch case study. Gallent (2006) reinterpret this as a potential locational advantage, as the environmental awareness of consumers regarding agricultural production increases. Other commentators remain doubtful however, arguing that urban proximity offers only a limited development potential for the marketing of local products due to the globalised food market (Lohrberg, 2001; Hildmann and Casper, 2004; Jarosz, 2008). Depending on the specific product type, less than 20% of the yields are marketed regionally, with vegetables more prevalent than cereals (Hildmann and Casper, 2004). Concentration of direct marketing on a particular consumer segment (characterised by highly affluent and educated individuals) is seen as a critical limitation that prevents direct marketing from being a true alternative to anonymous mass-production (Lohrberg, 2001). However, Wilson (2007) argues that locally embedded production and short supply chains reduces dependency on world markets, and contributes to a strong multifunctionality of agriculture, particularly in the peri-urban area.

Multifunctional development of peri-urban agriculture

Agriculture in peri-urban areas is under tremendous pressure. Market liberalisation and earning squeeze for arable and livestock production, socio-economic transitions, and a land-market situation characterised by high land prices and decoupling ownership–producer-relationships are all factors that have influenced the debate as to whether agriculture has a chance of survival at the fringes of urban agglomeration (van der Falk et al., 2009). By focusing on peri-urban areas across Europe, this literature review has attempted to draw attention to the opportunities and perspectives that the multifunctional development paradigm offers in regards to adapting and modernising PUA.

Lifestyle changes, increasing leisure time, a 'quality of life' orientation and growing environmental and climate change concerns have all contributed to urban society's increasing interest in having agriculture at its doorstep. Along with its role in preserving biodiversity, as well as delivering fresh air, drinking water and regional food, farming in peri-urban areas is recognised as an integral part of the cultural landscape, which provides environmental amenities, accessible green open spaces and recreational services. But as a pleasant living environment, it also attracts new and affluent neighbours who purchase small holdings, which in turn drives up housing development and land prices. Despite, a further erosion of the productive capacity, by responding to this multitude of urban demands by adapting farm strategies, PUA has improved its economic viability. Farmers in peri-urban area often find direct ways for directly marketing their own production while diversifying on-farm activities, such as farm accommodation or horse-keeping. More recently, services with a focus on educational and health care represent another growing field of peri-urban farming activity. In contradiction to the high societal demands for an aesthetical and amenity-rich countryside around urban areas, landscape management and agri-environmental measures are no more common than anywhere else in the rural areas. Potential synergy effects between landscape management practices and other diversification measures remain underdeveloped. However, driven by a more lifestyle

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and environmental focus and less exclusively an economical one, urban-oriented adaptive and lifestyle farming types, which are both prevalent in PUA, possess a high affinity to diversify activities beyond conventional crop and livestock production.

Multifunctionality embraces numerous development issues intrinsic to the agricultural countryside in and around towns and cities. In the face of ongoing urban growth, particularly dynamic in peri-urban areas, land resources for agricultural activities are limited and shrinking. At the same time, there is an increase in competing land use activities and interests in the remaining open spaces, such as between recreation, nature protection and intensified agriculture (Rode and von Haaren, 2005; Rogge et al., 2008). Making use of synergy effects and conflict mitigation, multifunctional land use approaches enable efficient provision of these functions and values. Nevertheless, it is important to note that the proliferation of cultural landscape or environmental amenities requires agricultural activity, at least to some extent. Through the provision of marketable or otherwise compensated production of goods and services on the same piece of land, multifunctionality strengthens the economic foundation of PUA, preventing land abandonment. It enables farming as an economically reasonable and competitive alternative to urban development. In this sense, the encouragement of multifunctional PUA represents a complementary element within a double strategy to safeguard valuable open spaces as well as to limit and manage urban growth in peri-urban areas.

Policy and planning for a multifunctional peri-urban agriculture

Reconnecting urban–rural relationships

Many peri-urban areas are far too often represented as fragmented administrative and decision-making entities with frontlines of separation, competition and conflict between the urban and rural spheres. Existing functional interrelationships are neglected, and common perceptions of the values and functions of PUA are left underdeveloped. A policy arena covering the area of the central city and the peri-urban surrounding on the basis of functional interrelationships of rural and urban compartments has therefore been requested. The European Spatial Development Perspective (European Commission, 1999) highlighted the necessity to integrate the surrounding countryside in the spatial development strategies of urban areas to improve the efficiency of land use planning. Vejre et al. (2007a) and Overbeek (2009) argue that a dialogue that includes urban and rural stakeholders and land use actors is needed to evaluate and discuss common interests and perceptions, including what PUA should provide urban society. As Vejre et al. (2007a) point out, when implemented within a common policy and planning agenda, this could lead to an improved socially optimal mix of PUA's functions and services for the urban society. An enhanced understanding of the role of urban consumers is necessary – one that takes consumers' preferences for values and functions into consideration. Along with innovative producers, informed and interested consumers foster the exploitation of the multifunctional potentials of the peri-urban countryside more efficiently. To link the provision of functions and services of PUA with society and potential consumers, it is necessary to reinforce urban–rural linkages.

Zoning, agricultural preservation and urban containment

As a main requirement of a multifunctional development of agriculture and countryside, the preservation of farmland along with open spaces in the peri-urban area is carried out in many European countries through urban containment and growth management policies. Combined with financial incentives, zoning and urban growth boundaries represent the main planning instruments, such as the Green Belt in the UK (Munton, 1983; Gant et al., 2011), the Copenhagen "Fingerplan" (see Vejre et al., 2007b) or the Green Heart within the Randstad metropolitan region and buffer zones in the Netherlands (see Koomen et al., 2008). The main idea of these concepts is to geographically define zones, adjacent to urban areas (where urban development is prohibited or limited) to prevent encroachment of urban sprawl into the peri-urban open spaces. Adopted in the different countries between the 1930s and 1960s, these zoning schemes have become relatively important and successful in limiting urban growth in the designated areas: developments has been postponed (Gant et al., 2011), general urbanisation rates were reduced (Koomen et al., 2008) and structural requirements for open-space development have been retained (Vejre et al., 2007b). Additionally, territorial separation allows for the coexistence of conflicting land uses within the peri-urban area, either production intensive or leisure and environmentally oriented (Daniel and Perraud, 2009). However, the actual impact of these zoning measures on land preservation is a moot point. Not limiting urbanisation potential in general, restrictions within the open space zones only redistribute development pressure to areas adjacent to them. As Robinson (2004) argues, containment policies put additional pressure on the suburban neighbourhoods and brownfield redevelopment inside the Green Belt, and encourage urban leapfrogging outside of it. Furthermore, changing growth boundaries, local calls for restriction easements, and uncoordinated municipal planning and development permissions (which have been observed in various regional settings) have all raised doubts over the zoning measures' preservation ability (Vejre et al., 2007b; Koomen et al., 2008; Gant et al., 2011).

The criticism applies even more for the multifunctional development of farming in the peri-urban area. Open space preservation comes under the purview of natural areas rather than farmland. Although natural areas enjoy high valuation by the public from an environmental and aesthetic perspective, farming is only given a marginal reason to survive in the peri-urban area (Koomen et al., 2008). More societal acknowledgement is required for the functions and values agriculture can provide the urban public, such as local food and comparably cost-efficient provision of landscape features. Kerselaers et al. (2011) have called for a clear vision as to how and where agricultural land under pressure should be preserved. To this end, they have developed a decision-support mechanism that not only includes agricultural production criteria, but also covers the provision of the multiple social and ecological functions of agriculture. There is strong evidence from various peri-urban case studies that public planning is not capable of addressing the small-scale functional transformations beyond physical land cover changes. Typically, zoning legislations are undermined through the spread of non-agricultural land uses on farms, or the switch from full-time farming to the consumption-oriented use of hobby farmers and residents (Vejre et al., 2007b; Bomans et al., 2009). In contrast to planning methods, which prescribe durable land use, the regulation of a peri-urban post-productive and multifunctional agriculture requires a greater flexibility to respond to the dynamic transitions and the mixture of land uses.

Scholars such as Shoard (2002) as well as Gallent (2006) have criticised the adoption of preservation planning like the Green Belt in the urban fringe as a defensive preservation approach, which rather reinforces the urban–rural divide in planning while lacking a positive and visionary development agenda. Gant et al. (2011) have formulated the need for a proactive approach with

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a specific peri-urban agenda. However, it can be agreed that it is necessary to actively control and supervise the transformation of the peri-urban agriculture, its diversification process and the targeted provision of environmental services to meet urban demands. Gallent et al. (2006) and Rode et al. (2006) argue for the possibilities of consensus-oriented concepts of commonly shared, multipurpose land, which enable multifunctional development in a closer sense by spatial and temporal integration of multiple activities and intermediate agricultural land use approaches. Heading in the same direction, Leinfelder (2009) proposed an adaptation of the traditional zoning practice in the case of open space planning. Instead of a geographical definition of a future land use, he suggests a "strategic zoning" approach, which describes purposes and contextual conditions. This appears particularly promising, as it provides a planning opportunity to formulate and support the required coexistence of the same entity's multiple purposes.

Rural development policy

The spatial conditions in peri-urban areas for agricultural land use differ substantially from peripheral rural ones. However, the agricultural policy and support systems in Europe are still rather oriented towards a continuous rural area. van Berkel and Verburg (2011) argue that this uniformity throughout the EU to promote environmental and land management incentives, as well as single farm payments, does not reflect the diversity of the rural countryside in relation to their development trajectories and framework conditions. This particularly does not meet the requirements of a multifunctional and post-productive development perspective of PUA. To comply with the specific local peri-urban framework conditions, agriculture and rural development schemes require pronounced regional targeting. The consultation process for the reconfiguration of the Common Agricultural Policy has highlighted that PUA requires specific attention (European Commission, 2010). To strengthen PUA against farm-structural changes and urban pressure, support schemes need to be tailored to small and active farmers who focus on peri-urban-specific farm diversification and agri-environmental measures. Changes to eligibility criteria are necessary, such as minimum farm sizes and long contract durations for participation in AES, which inhibit any flexible response to changed land use conditions. In addition, low entry levels of AES (easily adoptable due to low requirements) encourage rather extensive measures, such as pasture management, which is better suited to more remote rural areas. Focusing on local conditions encourages efficiency in the demand-oriented provision of public goods and services. Territorial instruments such as the LEADER initiative or the Less Favoured Area scheme provide interesting approaches, as they support local actors, rural innovation and the inherent agricultural development opportunities on a limited geographical scope.

Conclusion

Although peri-urban areas are exposed to urban pressures, socio-economic and land use changes which all challenge the economic basis of the farm's survival, this literature review has shown that the multifunctional development paradigm provides an approach that strengthens and modernises peri-urban agriculture. There is a reasonable demand among the urban public for multiple functions and values from farming. Environmental and landscape amenities, which directly contribute to the regional quality of life, are particularly highly valued. Beyond that, peri-urban agriculture is increasingly acknowledged for its deliverance of local food as well as recreational, educational and other social services. After decades of adaptation, peri-urban farmers have innovatively responded to the pressure and opportunities attached to their geographical adjacency to urban agglomerations. Peri-urban farming is now characterised by a heterogeneous pattern of holdings with intensive and specialised production, high participation in diversification, and low-intensive hobby and lifestyle oriented farms. However, preservation and multifunctional development of agriculture in the peri-urban area requires a broad range of policy and planning measures. Urban containment and zoning measures (such as green belts) provide necessary prerequisites for the open-space preservation in general. Nevertheless, planning instruments have to be adapted to the requirements of multifunctional agriculture. The peri-urban area needs to be recognised as an individual policy arena to overcome the urban–rural divide and strengthen urban–rural relationships. Agricultural policies and financial incentives should take into account a peri-rural area's difference to the rural countryside, and target development guidance at the situation within the border of urban and rural zones.

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