



## Planning the horticultural sector Managing greenhouse sprawl in the Netherlands

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### ABSTRACT

Greenhouses are a typical example of peri-urban land-use, a phenomenon that many planning systems find difficult to address as it mixes agricultural identity with urban appearance. Despite its urban appearance, greenhouse development often manages to evade urban containment policies. But a ban on greenhouse development might well result in under-utilisation of the economic value of the sector and its potential for sustainability. Specific knowledge of the urban and rural character of greenhouses is essential for the implementation of planning strategies. This paper analyses Dutch planning policies for greenhouses. It concludes with a discussion of how insights from greenhouse planning can be applied in other contexts involving peri-urban areas.

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### Introduction

The important role played by the urban-rural dichotomy in planning practice is a complicating factor in planning strategies for peri-urban areas, often conceptualised as border areas (the rural-urban fringe) or as an intermediate zone between city and countryside (the rural-urban transition zone) (Simon, 2008). However, “[t]he rural-urban fringe has a special, and not simply a transitional, land-use pattern that distinguishes it from more distant countryside and more urbanised space.” (Gallent and Shaw, 2007, p. 621) Planning policies tend to overlook this specific peri-environment, focusing rather on the black-and-white difference between urban and rural while disregarding developments in the shadow of cities (Hornis and Van Eck, 2008). Planners who have to address issues in peri-urban areas cannot fall back on the pre-conceived urban or rural identity of typical land uses. Planning designates many land-uses a rural or urban identity, which determines whether these land-uses may be developed in a given area or whether they must be restricted by an urban containment policy. Most traditional urban containment policies are not tailor-made for hybrid peri-urban land-use.

As a result, peri-urban types of land-use are difficult to plan. Peri-urban areas are often institutionally fragmented with ‘front-lines of separation, competition and conflict between the urban and rural spheres’ (Zasada, 2011, p. 645). Land-use regulation is

not always the most effective way to promote landscape values and economic development or to meet the needs of communities on the urban fringe. It is challenged by a ‘blurring of the urban edge’ (Gallent and Shaw, 2007, p. 620), characterised by interwoven urban and rural functions and specific land-uses. There are wide variations in peri-urban land-use and in the price and dynamics of hybrid land. Planning proposals may overlook current land-uses in peri-urban fringe areas (Randolph, 2004). Hybrid peri-urban types of land-use, such as allotment complexes and caravan and greenhouse sites, have both urban and rural characteristics: though their function is often perceived as rural, their appearance is primarily urban. The price of land for these functions usually lies somewhere between the price of extensively used agricultural land and urban land (Van der Valk et al., 2009; Van Rij and Korthals Altes, 2010). Since changes in land-use often take place on the fringes of cities, hybrid peri-urban land-use tends to be highly dynamic and characterised in some cases by less structural continuity than in traditional urban development and a wide diversity of land-use and development patterns (Gallent, 2006). So, the identity of peri urban areas (and greenhouses within these areas) is not fixed. Planning and governance may relate to these changing identities (Paasi, 2010, 2012; Zimmerbauer, 2011).

This paper focusses on one particular important type of peri-urban land use: greenhouse horticulture. Greenhouses are a typical example of hybrid peri-urban land-use. On the one hand, greenhouse horticulture is a kind of agriculture, so it fits in with the rural domain. On the other, the urban appearance of greenhouses can undermine the quality of the landscape near cities. However, greenhouses can also reflect a dynamic and highly innovative form

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of land-use with the potential to support the economy and improve sustainability.

This paper examines the Dutch case in general and various sub-cases, areas where specific policies are applied, in particular. The Dutch case is chosen because the Netherlands have required particular experience with greenhouse planning in the last decades. Horticulture is a viable economic sector competing with many other types of land-use in the densely populated area of the Randstad.

The aim of this paper is to add to the knowledge of peri-urban planning by studying the planning of greenhouse sites in the Netherlands. It starts by introducing the characteristics of peri-urban land-use and greenhouses in particular. This section discusses the development of greenhouses cultivation and introduces issues of greenhouses in relation to planning and landscape change. After that, the Dutch case is introduced; the case study is separated in four subsections: (1) restrictive land-use plans to contain greenhouse growth, (2) economic instruments to dismantle existing greenhouses on unsuitable locations, (3) strategies to stimulate the development of greenhouse clusters and (4) Midden-Delfland, an area under heavy pressure for greenhouse development, which launched identity-based strategies to promote alternative development. The paper ends with a discussion and conclusion on how the lessons from the study of greenhouses can be applied to the planning of other peri-urban types of land use.

### Greenhouses as lasting peri-urban land-use

Greenhouses are an example of a hybrid peri-urban land-use. The following section introduces the characteristics of peri-urban land-uses and greenhouses in particular. This section shows that greenhouse horticulture is presently not anymore being considered as a type of land-use from the past. Greenhouses cultivation is an innovative and increasingly sustainable sector which need to be addressed by land-use policies.

In many countries greenhouse complexes are situated on the periphery of large urban areas. Having acquired more of an industrialised appearance over the years, greenhouses are a clear example of an originally agrarian type of land-use which has assumed urban features. Since many city dwellers work in greenhouses and many greenhouse products are consumed, redistributed or prepared in cities, there is a clear link between greenhouses and cities. In a way, greenhouses may fit in with the notion that 'the multifunctional development paradigm provides an approach that strengthens and modernises peri-urban agriculture.' (Zasada, 2011, p. 646) However, in other cases, such as the Westland in the Netherlands (Terhorst, 2006) and Almería in Spain (Aznar-Sánchez et al., 2011), theories on the development of industrial clusters appear to be more appropriate. In still other cases, such as the Ohio Greenhouse project (Gatrell et al., 2009) and Flanders (Rogge et al., 2011), cluster strategies have been launched to promote economic development.

Traditionally, many greenhouses were situated in areas with a moderate climate, mainly coastal areas near metropolitan hubs. Typical examples are the Westland in the Netherlands, the British Channel Islands and other greenhouse sites in North-West Europe. Greenhouses provided the domestic market with early fruit and vegetables that were difficult to grow in local climate conditions. Greenhouse horticulture supplied the city and its hinterland with fresh fruit, vegetables and flowers (Mackintosh, 1977; Van den Berg, 1993; Mendis, 2007).

Until recently, the professional ideas on how to deal with greenhouses as an unwelcome form of urban sprawl were based on the expected decline of the sector. Improved modes of transport and the emergence of a single European market prompted agricultural experts to predict the demise of the greenhouse

industry (Sonneveld and Voogt, 2009). Field-grown products from Mediterranean regions could replace greenhouse-grown products in Western and Northern Europe and thus repeat the pattern observed in North America, where the north-east was supplied with produce grown in the southern states. These predictions proved unfounded and there are 'sufficient arguments' (Sonneveld and Voogt, 2009, p. 2) to suggest that greenhouse horticulture will continue to play an important role. At present, many horticultural products are transported over long distances and compete freely with field-grown products from all over the world. Tomatoes in the USA are no longer transported from the fields of California; most of them are imported from Canadian greenhouses in the summer (Mendis, 2007, p. 106).

Worldwide, greenhouses are taking up more space. In more southern and arid regions such as Mexico, the southern US states, the Mediterranean and China, greenhouse and plastic-tunnel horticulture is a booming business (Yilmaz et al., 2005; Mendis, 2007; Bakker, 2009; Sonneveld and Voogt, 2009). And Japan and South Korea are following suit. In the latter country most of the 52,000 ha of protected agriculture is in single plastic tunnels, and only a small, but growing part of the horticultural activities is accommodated in modern facilities with climate control, where the Dutch agricultural sector hopes to find export opportunities for its technology (Stallen and Van Uffelen, 2006). Greenhouses are also found in equatorial regions such as Tanzania (Msogoya and Maerere, 2006).

One important reason why greenhouses are taking up more space worldwide is that they lend themselves to sustainable technologies. The use of greenhouses dramatically reduces the need for water in regions such as Almería (Spain) and Israel (Sonneveld and Voogt, 2009, p. 395). Technological innovation is expected to enable the re-use of drainage water in substrate systems for a longer time than at present without disrupting growth. It may also be possible to close the water cycle on a regional scale in dense greenhouse areas (Sonneveld and Voogt, 2009, p. 402). Greenhouses are seen as a promising perspective for the realisation of urban agriculture (Ohya et al., 2008). Research in Almería, the largest greenhouse area in Europe (Tout, 1990; Campra et al., 2008; Aznar-Sánchez et al., 2011), has reported a local cooling trend of 0.3 °C per decade, which shows no correlation with the trend in regional or global warming (Campra et al., 2008), and is attributed to the capacity of the greenhouses to reflect sunlight. This is contrary to the effects found near melting glaciers and urban heat islands.

The greenhouse sector has provided the setting for some major technological advances in recent decades – an extraordinary achievement, given that, in most countries, it is dominated by small family-owned firms. The general consensus is that local economies based on small and medium-sized enterprises (SME) are being challenged by an innovation gap because businesses lack critical mass (Parrilli et al., 2010). In the greenhouse sector, particularly in the Netherlands, there is no such innovation gap, presumably because greenhouse farmers operate in knowledge-sharing networks in which small companies collaborate rather than competing with each other (Terhorst, 2006). Regional concentration has enhanced this trend and delivered many patents for the Dutch horticultural sector (De Man and Van Raaij, 2008), dubbed "the epicentre of the world's commercial greenhouse research" (Mendis, 2007, p. 173). These innovations aim not only to improve the quality of production but also to raise efficiency and reduce environmental pollution from horticulture.

Greenhouse-based production has long been regarded as incompatible with sustainable development (Woltjer and Van de Peppel, 2003). But this image is changing. In the 1970s, greenhouses in the Westland (the Netherlands) consumed huge volumes of cheap natural gas for heating, leading everyone to assume that rising energy prices would spell the demise of the sector. This has not happened. Admittedly, no more land is being used for greenhouses

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