

Land for agriculture? Conflicts and synergies between land use in two parts of Scandinavia

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When space is limited, there is often conflict over land use such as agriculture, nature conservation, housing, business and commercial enterprise. More knowledge is needed about the substance of such conflicts and the way the various uses are handled and spatially organised. Using empirical material collected in Hållnäs, Sweden, and Sandnes, Norway, between 2009 and 2012, this paper addresses the potential conflicts and synergies between the different uses of land, with agriculture as a reference point. In combining and comparing the results from Hållnäs and Sandnes, the way in which relations differ between them are also scrutinised. Through planning documents, interviews with officials in public authorities, active farmers, non-governmental organisations (NGO) and field visits, case-specific land uses are identified in the two areas. The conflicting and synergetic relations between agriculture and other ways the land is used are identified and illustrated by schematic models. The results indicate that agriculture is both in synergy and in conflict with other land uses. In the cases investigated in this study, the primary areas of conflict are between agriculture and biodiversity, between agriculture and cultural heritage, and between agriculture and climate-smart initiatives in terms of dense building structures.

Keywords: agriculture, land use, spatial planning, context, spatial relations, conflict, synergies

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Introduction

Since the beginning of the 1900s, the use of land in Scandinavian and other Western European rural areas has been undergoing great change, caused to a large degree by changing flows of food, goods and services (Kristensen *et al.* 2009; Woods 2011). Although the land is not now characterised by economic activities and uses such as farming and forestry alone, agriculture today is still a key vehicle for communities and economic development in rural areas (Marsden & Morley 2014). Given current concerns about food security and food sovereignty, it is problematic that land that was once agricultural is now being used for other purposes, and the ongoing sealing of soil alerts us to the need to take precautions with land that is in use for agricultural production (Slätmo 2017). This paper takes as its starting point the shared situatedness of agriculture, which implies that land is a limited resource and thus the object of struggle between a range of different land uses (Smith *et al.* 2010).

Previous studies on conflicting uses of land in Europe have taken different approaches, primarily focusing on conflict resolution (Niemelä *et al.* 2005; de Groot 2006; von der Dunk *et al.* 2011; Tudor *et*

al. 2014). These studies show that it is not certain that it is possible to maintain all diverse land uses, and their respective social functions, in synergy at the same place at the same time. Instead, conflicts are the rule rather than the exception (Olwig & Mitchell 2007; Smith *et al.* 2010; Elden 2013). In a review article, Henle and colleagues (2008) address conflicts between agriculture and biodiversity but do not fully take into account the sharing of space and non-functional relations between land uses. To address this point, this study contributes an understanding of how conflicts over land, as well as synergies, can be further understood in relation to agriculture, as it investigates the ways in which agriculture is in conflict with other land uses by applying a contextual approach. In addressing agriculture and the conflicts between it and other interests in terms of land use, the fundamental desire is to further discussions in order to find democratic solutions to these conflicts. This paper is based on the understanding that more clearly acknowledging the diverse conflict situations between different land uses can bring forth solutions and possible changes to planning practices.

European studies of conflict around land use that focus on agriculture and farming report that the conflicts are chiefly characterised by the social and environmental effects of an increasingly industrialised, corporately owned and capital-intense farm sector (Henle *et al.* 2008; Ribeiro *et al.* 2018). Indeed, agriculture is characterised by fewer and larger farms, and many farmers are leaving the agricultural sector (Hansson *et al.* 2010; Raggi *et al.* 2013). Parallel to this dominant trend, research shows an increase in organic farming as well as farm diversification (Hansson *et al.* 2010, 2013; Weltin *et al.* 2017); this is sometimes discussed in terms of amenity farming (Gill *et al.* 2010) or the different roles of farmers (Primdahl *et al.* 2013). There are tendencies towards heterogeneity and growing diversity of farming in the European context (Busck 2002; Sutherland 2013). This implies a diverse farmer habitus, concerned with environmental and ethical aspects in addition to economic returns from agriculture production (Setten 2004; Saunders 2016). In other words, not all farmers put economic gains first. Other activities associated with the land and farmsteads include, for instance, on-farm processing and sales, marketing, cultural events, tourism and green projects (Barbieri & Mahoney 2009; Hansson *et al.* 2013). These are reported as strategies used by farmers to open up a more diverse income stream, enabling them to stay on their land and continue farming (Morgan *et al.* 2010; Elgåker 2011) and can be considered a concrete expression of the post-production transition of the use of rural areas (Wilson 2001; Boonstra 2006; Eusébio *et al.* 2017). Such a transition results in heterogenic rural landscapes with diverse functions (Woods 2011; Hedlund 2016).

The diverse outcomes and functions of agricultural activities reported above make it interesting to analyse the way in which agriculture is not only in conflict but also in synergy with other human activities (e.g. the uses of land). The diverse societal functions of agriculture have previously been discussed under the umbrella concept of multifunctionality, in which agricultural values of production, consumption, recreation and preservation are highlighted (Bills & Gross 2005; Bjørkhaug & Richards 2008; Morgan *et al.* 2010). From an environmental perspective, the concept of multifunctionality has positive normative underpinnings as it includes the aim of enhancing agricultural activities that operate multiple functions on the same field, pasture or farm. Multifunctional agriculture is one of the priorities in terms of policy, both in the Scandinavian countries and the European Common Agricultural Policy (CAP) (Yrjölä & Kola 2004; Almås 2005; Potter & Tilzey 2007; Hodge *et al.* 2015; Grashof-Bokdam *et al.* 2017).

The aim of this paper is to investigate potential conflicts and synergies between different uses of land, with agriculture as a focus. Based on two Scandinavian cases in Hållnäs in Sweden and Sandnes in Norway between 2009 and 2012, and with a focus on agriculture, the analysis explores two questions: 1) To what degree are particular land uses commensurable with agriculture in the two cases?, and 2) In what way do the relations differ between the two cases? Through these questions, the paper reveals the case-specific conflicting and synergetic relations between different agriculture and other land uses.

Following the introduction, the next sections portray the studies, including methods and the analytic approach. The results are then presented, focusing primarily on how public authorities in spatial planning and nature resource management value agricultural lands in relation to other land uses, in Hållnäs and Sandnes. The next section discusses the results, highlighting the identified conflicts, policy approaches and conflict resolution strategies used by officials in spatial planning. The concluding remarks consider the insights from the analysis.

Studying synergies and conflicts in Nordic agriculture

The studies: Hållnäs and Sandnes

It should first be noted that taking the perspective of agriculture as a starting point for the analysis in this paper does not indicate a belief that agriculture should be prioritised over all other land uses. Decisions about land use are political decisions, for which land-owners and politicians are primarily responsible. Further, the study and discussion of conflicts and synergies over land is temporal-specific. This means that the results presented in this study reflect the situation in the areas of the study during the years 2009–2012.

Based on interviews, document studies and field visits in the two case areas, the spatial relations between agriculture and other land uses have been analysed with consideration to context. The study is deductive. This means that the investigation began by collecting empirical material in order to get a broad view of processes around land-use conflicts and synergies regarding agriculture, including the type of management methods in use from the perspective of the public authorities. The material collected with the deductive research approach has been scrutinised in this study in order to answer the research questions.

The Swedish case is the parish of Hållnäs, located on the south-east Baltic coast in the municipality of Tierp and the county of Uppland. Hållnäs is sparsely populated, with few active farmers. Most of the inhabitants (including most of the farmers) commute to nearby conurbations, such as Tierp, Skutskär, Forsmark, to work and to access services. The Norwegian case is the peri-urban area of Sandnes, located in south-west Norway close to the North Sea. Sandnes is administratively affiliated with the county of Rogaland and is positioned in close proximity to the city of Stavanger. As will be presented, the cases reflect the variety of geographies within which agricultural activities are performed, in two similar Scandinavian countries.

Documents relating to spatial planning and nature resource management were studied for both areas, with the aim of identifying and analysing the official authorities' designation and valuation of land use over time. In the case of Hållnäs, the documents studied were primarily three comprehensive spatial plans from the municipality of Tierp, from 1977, 1991 and 2009/2011. The documents studied in the case of Sandnes were three comprehensive spatial plans from 1995, 2002 and 2007. Regional plans, the basis for decisions and comments about the plans from public hearings and consultation processes were also studied.

Furthermore, to understand the relations between the identified land uses, farmers and officials involved in nature resource management and planning were interviewed and took part in seminar discussions on land-use planning during 2009–2012. Results based largely on the interviews have previously been published (Stenseke *et al.* 2012; Beilin *et al.* 2014; Slätmo 2014, 2016). The actors interviewed were local and regional officials, farmers, and farmers' representatives from Swedish and Norwegian farmers' organisations. In the case of Hållnäs, interviews were conducted with 9 farmers, 2 local authority officials, 2 regional officials and 2 people from civil society organisations between 2009 and 2010. In the case of Sandnes, 13 farmers and 9 local authority and regional officials were interviewed in 2011. In addition, 12 local authority and regional officials took part in a one-day discussion seminar in Sandnes in 2012. The interviews have facilitated knowledge around the case-specific situation for farming and spatial planning, how land-use conflicts are solved and how synergetic relations can be enhanced. Field visits to different agricultural sites in the case study areas have provided insight around the practicalities of conflicting and synergetic land uses. Although not presented in this paper, statistics and press material in the media have also been important in understanding the case-specific relations between agriculture and other land uses.

Analysing agriculture and land use contextually

Based on geographical theory, this paper draws on a contextual perspective that implies that geophysical processes, things, organisms and human activities are physically entwined, and that they affect one another through this material proximity without necessarily having a functional relation

(Törnqvist 1981; Woods 2009). The contextual perspective therefore makes it possible to analyse the physical coordination, struggle over and sharing of space (Hägerstrand 1970, 2009; Stenseke *et al.* 2012); in other words, the conflicts and synergies over land.

Importantly, such a contextual approach is not necessarily innovative. Rather, it draws on the basic tenets from the early days of the subject of geography, when descriptive studies based on case studies were used to understand and make sense of the physical and social relations that constitute the world (Sauer 1965; Olwig 2002; Mels & Setten, 2007). While acknowledging the history of geography, the study is also informed by newer geographical scholars such as Widgren (2004), Cosgrove (2006), Clark and Munroe (2013) and Wästfelt and Zhang (2016), who call for contextualising studies on agriculture and land use, for example by studying agriculture by placing it in its social and geographical contexts.

For this paper, this situated or contextual perspective has been applied to identify the possible synergies, conflicts and priorities between agriculture and other human activities (such as land use, in this case). To be able to make sense of these relations (to analyse the conflicts and synergies, in this case) it is necessary to 'know' the societal context and integrate a perspective in which humans are active in the changes of the physical environment (Head 2012; Slätmo 2016). As mentioned above, the results in this study build on a range of different empirical materials collected during a period of three years. To identify the most prominent land uses in the two cases, and their relations to agriculture, the collected material has been read, sorted, re-read, presented and discussed with stakeholders (including other researchers with and without case-specific knowledge). The land uses presented in this study are the ones most prominent in the empirical materials. This approach has also enabled the relations between the identified land uses and agricultural lands to become apparent.

In communicating the results, these relations are presented using case-based schematic models, and discussed in terms of conflict and synergy with agriculture. Importantly, as the models do not display nuances, they should be interpreted with care and the description of the conflicting and synergetic relations is as important as the figures themselves.

Agriculture and conflicting and synergetic land uses

A number of land uses and their societal functions and values have been identified in the empirical material from each of the two cases. These designated land uses are based on different logic, have different routes for decision-making and have different regulations tied to them, which makes it appropriate to think of them as categories that are theoretically and functionally separated from each other (Boonstra 2006; Stenseke *et al.* 2012). But at the same time, from a contextual geographic perspective, they are searching for and claiming space in the same territory and are therefore in conflict over space in the material sense of the word. The land uses presented in the sections below are based on the most prominent arguments, priorities and motives found in the empirical material. This approach has also enabled the relations between the identified land uses and agricultural lands to become clear.

Conflicting and synergetic land uses in Hållnäs, Sweden

Agriculture is both in synergy and in conflict with other appointed land uses on the peninsula. Four categories of land use have been identified in the analysis of the planning documents: agriculture; natural environments and biodiversity; cultural environments and cultural heritage; and tourism and summer residents. Based on interviews and other stakeholder interactions, the relations between the identified land uses have been elaborated as a schematic model (Fig. 1). In the next sections, these relations are presented and discussed in relation to agriculture.

Local authority planning highlights *tourism and summer residents* as a societal interest that is important for the Hållnäs area. In the comprehensive plan from 1977, the local authority stated that a general decrease in work hours in Swedish society would increase the amount of holiday time for the population. It was assumed that this increase in non-working hours implied there would be an increase in demand for land to build houses and premises for summer residents and tourist activities, especially along the coast where Hållnäs is located. The coastal area is also the district that saw the

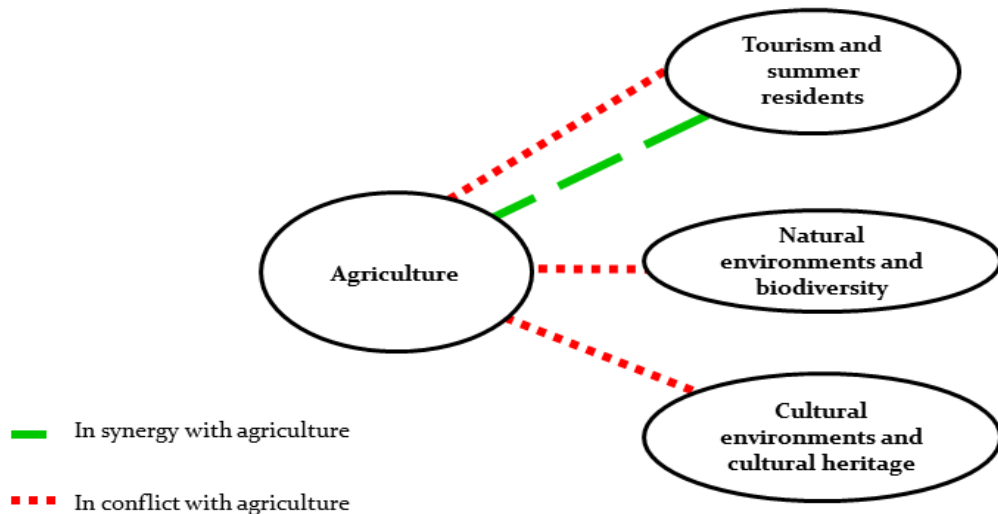


Fig. 1. Identified land uses in the spatial planning of Hållnäs, with dominant relations to agriculture

largest decrease in numbers of permanent residents in the 1970s, and an increase in tourism was seen as desirable for securing service levels. To ensure such a development, the municipality appointed 1,200 plots for building summer cottages along the coast and expressed the view that, as the demand for plots was so high, they would all be bought and developed by the year 1990. Interviews, field visits and planning documents show that the assumed high demand for plots for summer cottages in the 1977 plan was not entirely realised.

The municipal spatial plan from 1991 stated that rural development was an overarching goal for the development for the whole locality including the Hållnäs area. This goal was not explained or elaborated in the documents (therefore it is included in 'tourism' in the schematic model in Figure 1). In the planning documents from 2009, the local authority once again appointed areas for the development of tourism and plots for building summer cottages along the coast in Hållnäs.¹ Through these proactive initiatives, the local authority sought to steer the development of housing and set up clearer boundaries between different land uses and societal interests. Along the coast, three land areas were appointed as 'development areas' to ensure development and growth in the Hållnäs community. Outside these areas, the local authority restricted the issue of permits for summer housing; because of its unique environmental features, especially the eastern part of the coast, it was considered important to protect the Hållnäs peninsula from housing and other developments.

The local authority's designation of land for tourism and housing for summer residents can be a promising strategy for rural development while at the same time preserving desirable natural and cultural heritage values. In their study of European and Swedish rural policies between 2000 and 2013, Almstedt, Lundmark and Pettersson (2015) state that tourism is important for restructuring the rural economy. However, this importance is foremost expressed as political rhetoric and has limited impact if related to the spending of public funds. Almstedt and colleagues (2015) therefore argue that it is questionable whether such initiatives will contribute to a restructuring of the rural economy to any significant degree. In the case of Hållnäs, tourism and summer residents can indeed be in synergy with agriculture, as they can have positive effects on securing service levels and maintaining the vibrant rural area. Indirectly, therefore, they can enable maintained farming. Importantly, public authorities cannot create such developments single-handedly, but by directing public funds and zoning land use, they can enable (and/or restrict) such initiatives. At the same time, prioritising land

for new establishments for the purposes of tourism comes with the risk of not prioritising ongoing agricultural activities, so these initiatives can therefore also conflict with agriculture.

Maintaining agriculture for food production or from a business perspective does not feature prominently in the empirical material studied for Hållnäs. In all the planning documents studied and in interviews with officials, *agriculture* in Hållnäs is instead stated to be closely related to *natural environments and biodiversity values* as well as *cultural environments and cultural heritage values*. Due to strict national agricultural and land-use policies during the 1970s, each Swedish local authority was obliged to develop policy programmes to show how the agricultural lands within the municipal territory were to be ensured.² In Tierp, the administrative body of which Hållnäs is part, the programme was created together with the comprehensive spatial plan in 1977. In this agricultural programme, it was stated that maintaining agriculture was important for the community of Hållnäs, as it was related to the importance of maintaining population levels and protecting natural and cultural heritage values.

This evaluation of agriculture as a prominent element in maintaining biodiversity and cultural heritage is also apparent in later official documents and in interviews with both farmers and officials. In the 1991 plan, the whole of the Hållnäs peninsula was designated as being under legal conservation protection due to its ecological and cultural heritage values. Its diversified landscape, with forests, wet lands and agricultural lands, was described as one of the reasons the area was so interesting and in need of protection. Since then, any development that could threaten the character of this diversified landscape has been forbidden on the peninsula. Although the specific legal paragraphs that relate to it are certainly no longer in force, the valuations still affect Hållnäs in policy documents, management by public authorities and the ongoing use of land. Today, a large part of the land area has also been put under various forms of legal conservation. Besides its extraordinary biodiversity (e.g. red-listed species in the forest and wet lands), some small-scale agriculture lands (e.g. pastures and fields) also have high natural and cultural values and have therefore been designated as conservation areas of various types (Lindborg *et al.* 2008). For instance, based on cultural heritage and biodiversity arguments, the area of Lingnåre has been earmarked for farm management initiatives that aim to ensure the farming methods and the 'old ways of living' maintain high-value biotopes and biodiversity. These initiatives have been supported by officials at the local and regional level, and by non-governmental organisations (NGO) at the regional and local Hållnäs level.

Although decisions and processes to implement conservation areas for nature and cultural heritage were reported to have improved during the 1990s and 2000s, land-owners and inhabitants in Hållnäs have been active in the hearing processes for all the plans studied here, and there are similarities in their criticisms of the management methods used by official authorities. Chief among these are protests about the appointment of land areas for nature and cultural heritage conservation, due to the restrictions that these conservation areas create for agriculture and other developments. This criticism goes back at least to the 1970s. In the hearing process for the plan in 1977, around 60 land-owners in Hållnäs lodged written statements to the local authority, criticising the establishment of conservation areas based on their right to continue to use their lands. One of the letters, written by 15 landowners in May 1976, ended:

Regarding the proposition to make Hållen and its agricultural lands a cultural village, we are of the certain opinion that any restrictions and regulations that might negatively affect the community need to be removed. We are unanimous in our undertaking to care for our own community in the future.

In the written material from the hearing processes in the 1990s and 2000s, the local agricultural organisation took a more positive view concerning the protection of natural and cultural values in the area, but claimed there was a need for higher financial compensation if lands continued to be assigned as protected for biodiversity and cultural heritage values. It was claimed that this was needed in order to avoid the risk of income deficit for single land-owners. Concerns of this kind were also raised during the interviews with farmers and officials. At the same time, other organisations and inhabitants in the area argued for the need for stronger and expanded protection of the natural and cultural heritage values in Hållnäs. This is indeed an ongoing struggle over the use of land.

Conflicting and synergetic land uses in Sandnes, Norway

Sandnes, located along the North Sea coast, is in close proximity to Stavanger, which results in high demand for land for new housing and business developments. The planning documents, especially the ones from after 2000, state that Sandnes has a regional responsibility to ensure infrastructure in the form of roads, as well as areas for housing, businesses and outdoor recreation. Moreover, according to regional and state authorities, the area is regarded as having some of the best quality soil for food production in the whole of Norway. The effect of this is that the valuation of land and decisions about how best to use it is a more of an explicit struggle than in Hållnäs. The analyses of the planning documents in Sandnes for this study have identified eight categories of land use: business and commercial development; infrastructure; housing and public services; soil preservation; natural environments and biodiversity; cultural environments and cultural heritage; outdoor recreation; and 'climate smart' planning strategies (e.g. dense development). Based on interviews and other stakeholder interactions, the relations between agriculture and the other seven land uses are illustrated in Figure 2. The relations are presented and discussed in the following sections.

The land-use category of *business and commercial development* is strongly emphasised in the spatial planning. With high demand for land, this interest is in conflict with ongoing agriculture. In the later plans, from 2002 onwards, there are strict descriptions of goals, strategies and measures for businesses and commercial organisations, an expression of the 'municipal will' to try to steer the development of land use towards certain areas. It should be noted that the officials interviewed in Sandnes stated that it was a struggle to separate some farming activities from businesses and commercial organisations. This was especially true in the case of intensive farming, which is industrial in character and uses greenhouses, large stables and/or sheds for food production and processing. If the spatial planning incorporated these agricultural activities in the land-use category of business and commercial development, it would, of course, be in synergy for this type of farming.

Sandnes is described in the planning documents as an important hub for land and water transport in the region, and *infrastructure* is therefore an important part of the politics of land use. The synergetic relations between infrastructures, businesses and commercial development and environmental issues are prominent in all the policies and plans that were investigated. The category of land use is here presented as being in conflict with agriculture in Sandnes, as the establishment of new roads and transportation routes would exploit land.

In all the documents studied for Sandnes, *housing and public needs* is expressed as the main category of interests in need of space. This is based on a strong increase in population, which is

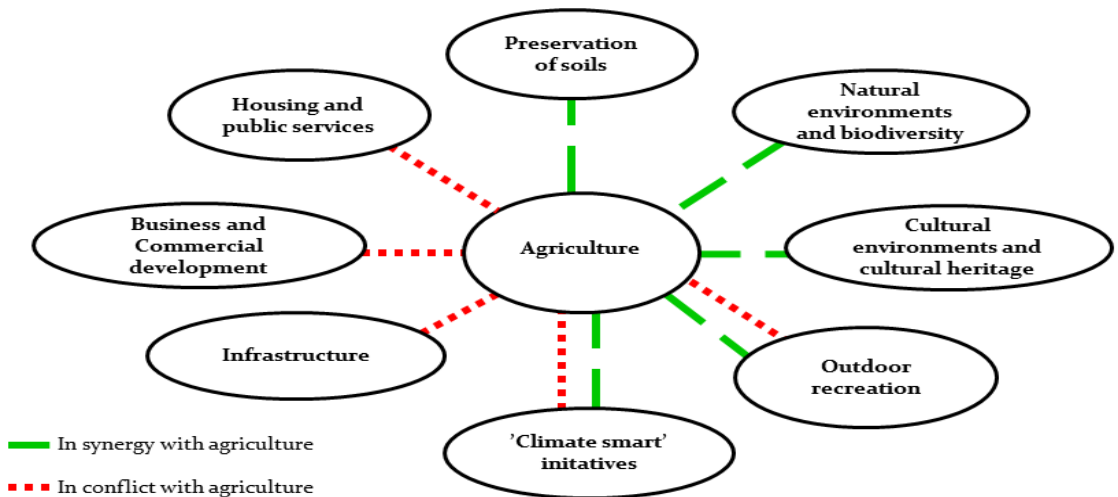


Fig. 2. Identified land uses in the spatial planning of Sandnes, with dominant relations to agriculture.

projected to be particularly large in the coming decades. Schools, childcare facilities and homes for the elderly are needed in addition to housing, in order to meet this anticipated development. The regional spatial plans from 2000 onwards have designated the eastern part of the Sandnes area as the next location for regional development. During interviews, officials in Sandnes pointed out that to improve the transparency of the local authority's goals of building new facilities for business, housing and public needs while at the same time preserving soil for food production, land that had been allotted for housing but was not in line with this regional planning decision had been re-categorised 'back to' agriculture land. The analyses have not included an investigation of this specific land but it should be noted that, judging from interviews with farmers in Sandnes, this land might already have been abandoned for farming and/or sold for other purposes, as political decisions to categorise areas as 'for development' in spatial planning affect farmers' willingness to continue farming and their motives for doing so. This is especially the case in peri-urban areas where farmers seem aware of the policy situation regarding the land (Slätmo 2016).

Soil preservation has high priority in Sandnes. The local authority states that it follows regional and national decisions on the issue.³ Due to high demand for land for business, commercial, infrastructure and housing purposes in Sandnes, specific areas have been designated for agriculture. In both local and regional spatial plans, a 'long-term border' for agriculture is drawn on the maps accompanying the written material. This border aims to emphasise that soil preservation should be prioritised within this zone. Soil preservation is therefore foremost in the synergy of maintained agriculture. Farmers in the area, however, report that the establishment of buildings and roads that they perceive as fundamental to developing their agricultural businesses have been denied permits due to the strict preservation policy.

It is of stated importance for the local authority to maintain and enhance the land-use category of *natural environments and biodiversity*, not least for its relation to outdoor recreation. *Cultural environments and cultural heritage* is not strongly emphasised in the arguments for preserving existing land uses. However, the 2007 plan states that cultural symbols and elements for creating value and strengthening local identity should be considered. In the municipal plans, cultural heritage and symbols are chiefly seen in terms of architecture and art in the built-up areas. In interviews with officials in public authorities, the categories of cultural environments and cultural heritage, and natural environments and biodiversity are stated to be most in synergy with maintained agriculture in Sandnes. Biodiversity and cultural heritage can co-exist with extensive agriculture, and this can strengthen the arguments for preserving agricultural lands in relation to other land uses, such as businesses, commercial and public properties, housing and infrastructure. But importantly, agriculture is more often in conflict with the preservation of natural environments, biodiversity, cultural environments and cultural heritage interests. Research has found that in Sandnes, conventional agricultural activities such as the spraying of manure on old semi-natural pastures (due to water directive regulations) are degrading the biodiversity on this land, and initiatives for making fields more effective to farm have been reported as damaging cultural heritage sites and monuments dating back to 1537 (Sollund Bøe 2013; Amundsen *et al.* 2013; Norderhaug & Thorvaldsen 2013).

Outdoor recreation is considered a central land-use interest for spatial planning in Sandnes, and areas for recreation were acknowledged as being important in regional and local development. In line with this, officials in Rogaland regional authority and Sandnes local authority have been working towards establishing walking paths on privately owned agricultural lands. Land-owners can apply for annual economic supplements in return for allowing others to use their land. The relations between the land-use categories of agriculture and outdoor recreation can thus be seen as synergetic. Several recreational areas are maintained through traditional farming practices such as grazing and haymaking, as well as more modern activities such as shops and cafés on the farms. This is a positive move for maintained farming but some Sandnes-located farmers also point out that an increase in numbers of people (and their accompanying dogs) in the landscape can disturb some of their farming practices. The strong prioritisation of outdoor recreation as a land-use interest can nonetheless be in conflict with agriculture in the struggle over land for other purposes. This conflict is ongoing in the choice and prioritisation of which land areas should be used for new housing, commercial and public properties, roads and other infrastructural purposes in the eastern part of the Sandnes area. The soil

here is not considered as fertile as in the rest of the region and officials acknowledge that the agricultural lands are more attractive for housing than the mountain region, as these areas are relatively flat and already 'prepared for housing' due to the farmers' clearance of stones.

The land-use categories of business and commercial development, infrastructure, and housing and public needs are here categorised as conflicting with agriculture land, as new establishments can interfere with the farming that is ongoing. To solve this struggle over land, an overall national strategy of *climate smart initiatives* has been established in Norwegian national planning policy since the 1990s, and spatial planning in Sandnes has adapted to this since then. This land-use category is a bit different from the other identified interests as it does not have the same direct physical relation to the land. Instead it is a strategy for how to place and organise the other land-use interests in space. During interviews and seminar discussions and in planning documents, it is argued that prioritising a dense building structure and using land that is already built up more efficiently will ensure low carbon emissions and preserve resources. As such, this type of climate smart initiative is in synergy with maintained agriculture.

Conversely, it should be noted that in the case of Sandnes, such strategies are not necessarily that 'smart' for preserving soil, especially in the peri-urban areas. For instance, the struggles for land to build on in the eastern part of the locality draw on climate-smart arguments. Interviewed officials clarified the 'attractiveness' of choosing agricultural land in preference to using land that is already built up or brown field sites for housing development; agriculture lands are perceived as attractive for housing due to their convenience in terms of land ownership (often there is only one owner of a large area of land compared to many owners of small areas in urban settings) and because arable lands are often flat and already cleared of stones. In turn, agriculture land has a relatively low risk of contamination compared to land formerly used for industry, commercial organisations or parking. These three aspects influence the costs of making land 'ready for development' and, combined with climate-smart arguments for dense housing structures, cities and built up areas constantly expand on fertile soil.

A visit to a struggling pig and cabbage farmer on the outskirts of eastern Sandnes in 2011 made it clear that one effect of urban expansion is that farm land that was not considered to be in the peri-urban area in municipal plans from the 1990s are most certainly urban today. This farmer's land was in the middle of a housing area with urban characteristics; for example, there was a network of asphalt roads between two-storey villas, each with its own garage and garden, within biking distance to the train station and city centre. During our talk the farmer said that he now more or less accepted the higher valuation of his lands for purposes other than farming. He saw himself as being forced to give up the farmstead he had inherited from his father's side. Although sad and a little ashamed about this, he was not completely devastated or worried about carrying on as a farmer as he also ran a farm he had inherited from his mother's side in a more rural location.

Two main areas of conflict, and the case-based solutions

As presented above, the shared situatedness of agriculture in Hållnäs and Sandnes reflects two differing geographies within which agricultural activities are performed. In Hållnäs, agriculture has conflicting relations with three other land uses. In Sandnes, agriculture has conflicting relations with five other land uses. Synergetic relations – that is, win-win or enabling relations – also exist. Based on the results of the interviews, two of the most prominent conflicting relations between agriculture and other land uses are: 1) maintained agriculture and preserved biodiversity and cultural heritage in Hållnäs, Sweden; and 2) maintained agriculture and the adaptation of cities to climate change by means of dense building structures in Sandnes, Norway. Drawing on the cases of Hållnäs and Sandnes respectively, these two respective conflicts, and how they are handled by the public authorities, are elaborated in the sections below.

Maintained agriculture and the preservation of biodiversity and cultural heritage

The foremost non-explicit strategy for spatial planning in the Hållnäs area has been to prioritise nature conservation and cultural heritage. In the planning documents and in an interview with the

planning department covering the Hållnäs area, the extensive agriculture was valued for its contribution to Hållnäs' natural environments and biodiversity, as well as the cultural environment and cultural heritage. It is remarkable, however, that agriculture in Hållnäs was not clearly valued for the food production to which it contributed or the business perspective that enabled inhabitants to stay in the area (and bring in tax revenues).⁴ Acknowledging that extensive agricultural activities contribute to a multiplicity of landscape values, as the official authorities do in the Hållnäs area, can enhance the perceived importance of maintaining agriculture. Research on multifunctional agriculture (Bills & Gross 2005; Bjørkhaug & Richards 2008; Morgan *et al.* 2010; Grashof-Bokdam *et al.* 2017), however, shows that for such synergies to appear, it is important that general criteria and policy schemes are adapted to the specific context and that farmers are enabled to use their competence and expertise (Lindborg *et al.* 2008; Burton & Paragahawewa 2011; Slätmo *et al.* 2017). This is necessary for it to be perceived as desirable to maintain or develop such farming activities.

As in many other geographical areas, the dominant planning strategy for the area of Hållnäs has been to establish different conservation areas to preserve desirable biodiversity and cultural heritage values (Hovik *et al.* 2010). Although such strategies can be fruitful in maintaining natural and cultural heritage values, they are restricting farmers in their search for new income possibilities (cf. Dahlberg 2015). To solve this conflict over the use of land, it is here suggested that a possible way forward might be to establish conservation areas combined with nature-based tourism via ongoing agricultural and forest activities through long-term management contracts. This would also be suitable for a maintained, vibrant Hållnäs area, especially if such long-term contracts were to consider the restrictions on smaller agricultural businesses.

Preservation and conservation as a spatial planning strategy were also identified in the Norwegian case, but not in quite the same way. Besides protecting areas for outdoor recreation, biodiversity and cultural heritage, protecting soil for food produce was also prominent in the land-use governance of Sandnes (and in regional and state policy). The acknowledgement of soil as a fundamental resource for food is positive in terms of maintained agriculture, as it clarifies that agriculture needs physical space (e.g. fields and pastures) to be realised. This acknowledgment gives farmers and agricultural land a more pronounced role in the spatial planning processes. Such a strategy does not directly solve any conflicts over land use, but at least the farmers, and their divergent roles and perspectives, are considered as a group of actors in the official authorities' land-use decisions.

Soil preservation and climate smart planning in terms of dense building structures

In the case of Sandnes, the land-use categories of business and commercial development, infrastructure, and housing and public needs were in conflict with agriculture, as new establishments can interfere with ongoing farming. To solve this struggle over land, an overall national strategy of 'climate smart' (e.g. dense) development has been established in Norwegian spatial planning policies (Slätmo 2014). During interviews with officials working with spatial planning in Sandnes, the view was expressed that the nation-state is like a 'troll with many heads'; that is, the many and divergent political goals are not always possible to realise at the same time in the physical landscape. From the perspective of local authority officials, the use of strict borders (e.g. land-use zones) as a planning strategy enables them to show state authorities that they are considering the range of different, and sometimes opposing, state goals. The troll metaphor, which is probably not unique to this case, was used in reference to the high-priority state goal of preserving Norwegian soil while at the same time assigning land for housing, infrastructure, outdoor recreation and so on. What in planning rhetoric is called 'the climate smart strategy' or 'area economising' (e.g. only allowing new housing and commercial properties near an already built-up area) was viewed by the officials as a constructive model to handle the trolls' many heads. The use of dense building strategies as a land-use strategy is also in line with international expertise on how to mitigate climate change and develop more sustainable societies. In a report from the Intergovernmental Panel on Climate Change, this is mainly discussed as a transit-oriented development (Seto *et al.* 2014).

From the perspective of the interviewed farmers in Sandnes, however, maintained agriculture also needs new housing and premises to develop. In such development, some soil might need to be

withdrawn from production, and the preservation logic outside non-built-up areas is not fully appreciated. Moreover, as illustrated by the pig and cabbage farmer in Sandnes above, the land areas that are viewed as being within the (peri-)urban area are changing over time, and therefore there is a risk that such general solutions for land-use governance will lead to productive soil being built on. This is especially the case when we consider what officials in Sandnes state as the 'attractiveness' of using agricultural land for other types of development (because agricultural land often has one owner, is relatively flat and free from stones, and has a lower risk of contamination).

'Climate smart' planning strategies were not mentioned in relation to the Hållnäs area. The rhetoric used in Norway regarding a willingness to promote dense building structures in order to decrease dependence on cars and allow for joint energy solutions is also dominant in Sweden (Borges *et al.* 2017); but the public authorities do not view such strategies as being directly applicable in Hållnäs, probably because Hållnäs is sparsely populated. Nevertheless, in practice the same principle of dense building structure was used for the Hållnäs area, as the planning authority uses zonation and designates non-built up areas 'for development' in order to direct any requests for new summer or other residences to the appointed areas.

Concluding remarks

In this paper, the presentation of the conflicting and synergetic relations between different land uses has been communicated by context- and temporal-specific schematic models. The results from the cases presented in this study reveal that agriculture is both in synergy and in conflict with other land uses. The above discussion on the conflicting relations shows that the planning authorities in the case studies of Hållnäs and Sandnes deal with the situations in different ways. The results therefore reflect that relations between agriculture and other land uses differ depending on the temporal and geographical context (Widgren 2004; Cosgrove 2006; Clark & Munroe 2013; Wästfelt & Zhang 2016). In the cases studied here, the conflicting relations have different expressions and therefore different strategies (or lack of strategies) from public authorities. The results are not generalisable; they illustrate the situation of land-use relations in Hållnäs and Sandnes during the studied years. Case-study-based studies can, however, indicate aspects of importance for other geographies (Niemelä *et al.* 2005; de Groot 2006; von der Dunk 2011; Tudor *et al.* 2014). Some aspects of importance that are to be learned from this study are that strictly focusing on conservation (as in Hållnäs) or on climate smart dense developments of housing (as in Sandnes) in spatial planning can spur land-use conflicts with agriculture.

To solve these conflicts, the official authorities involved in spatial planning at local and regional levels need to further acknowledge that agricultural lands are positively related – that is, are in synergy – to a range of desirable values (e.g. protection of soil, biodiversity, cultural heritage and outdoor recreation). This can work as a strategy to enhance protection from soil-sealing (Slätmo 2014), and also to further the integration of urban and rural areas. This speaks for the continued and enhanced use of multifunctionality in relation to agriculture and nature conservation. In turn, the 'attractiveness' of choosing agricultural land in preference to using land that is already built up or brown field sites for housing development speaks for the need for a proactive planning procedure and assessing different alternatives in decision making.

Notes

¹This local authority policy initiative was in line with changes in the national policies concerning coastal protection, inscribed in the environmental code, which opened up new built-up areas in certain coastal areas in order to promote the development of rural areas.

²Since the 1970s, agricultural and land policies at Swedish state level have not had this type of candid focus on soil preservation for agriculture. However, several policy measures to halt agricultural land-use change are in place (Slätmo 2017).

³Since the 1950s, Norwegian state politics have highlighted soil preservation as fundamental to securing self-sufficiency in food, preserving cultural heritage and securing income for individual

farmers. Through different policy measures, soil preservation in Norway has been strengthened since the 1990s (Grimstad 2013; Slåtmo 2014).

⁴Forestry is another issue about which the policies are remarkably silent. This is probably in some way related to the fact that forest companies own most of the forest land – approximately 70% of the total Hållnäs land area.

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