



# future farm land

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Developing a new layered cultivated landscape in the context of the struggling farming industry



## *abstract*

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Denmark is the most intensively farmed country in the world. But though soil in Denmark is very fertile, the farmers are struggling. Competition is hard on international markets selling conventional produce. Consequences of the structure of the industry is fixing farmers in a position where they cannot afford to convert their farm into a profitable business, and political solutions are pointing in the direction of polluting more.

Although agriculture has been one of the most important industries of Denmark, can we today accept that an industry employing only 3 % of the danish population, is occupying so much of the country's territory, making it inaccessible for the inhabitants as well as stressing the environment?

Using Lolland as an example of farmed land the project will utilize the existing strategy of the municipality pointing at tourism as being one of the major growth potentials.

The project will investigate how the farmed land can be reconfigured, creating a layered landscape that can allow more sustainable landuse, catering to both farmers and the public.



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Sofia Priisholm Petersen

The Royal Danish Academy of Fine Arts, School of Architecture  
Institute of Architecture, Urbanism and Landscape  
Program: Urbanism & Societal Change

Tutor: Morten Kjer Jeppesen



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## introduction

The danish land consist mainly of cultivated landscapes. Traditionally, Denmark has been an agricultural country and today 62% of the land is farmed, most under plough, which makes Denmark the world's most intensively farmed country. **Though the farmed land is occupying the majority of the land, macroeconomic importance of the industry is marginal and employs about 3% of the danish population.**

The ploughing of the countryside of Denmark exhausting the natural resources has resulted in a land of very low biodiversity, and a inaccessible land for the residents. Today, living in the countryside does not mean living in nature, but living in a cultivated landscape that produces massive amounts of crops, mainly to feed the production of pigs.

The farming industry is under growing economic pressure that the farmers are suffering under. The well known strategy of mass production and dependency on EU subsidies has fixed the industry in a situation where Danish farmers are competing with farmers from low wage countries, and are therefore losing money on producing conventional goods. The politics in the field are building on the logic of a strategy that has for years proven to fail, easing the restrictions on pollution and fertilization, but neglecting the reality of the rising competition of the liberal markets and decreasing EU subsidies.

The danish politics are still characterized by reluctance in implementing environmental friendly agricultural legislation, in fear of weakening the danish market in international competition. **In the current policies there is lacking visions for a future sustainable landscape of Denmark.**

Since the industrialization the nature has been influenced by the anthropocentric perception of nature; that man has a value in itself and nature and environment is assessed by whether it serves production for man, welfare and interests.

During the latest decades there has been a growing understanding of the environmental consequences of the exploitation of natural resources.

A product of this understanding is the National Forest Program, which aims to ensure that within this century the amount of forest will occupy 20-25% of the Danish land.

The ambition of having 25% forest in Denmark is not the only ambition for the Danish territory. The Danish Board of Technology Foundation has investigated the national area distribution, which shows that if the ambitions of all sectors are met, the area of Denmark needs to be 50% larger than today. This may be solved by combining the designated types of land use.

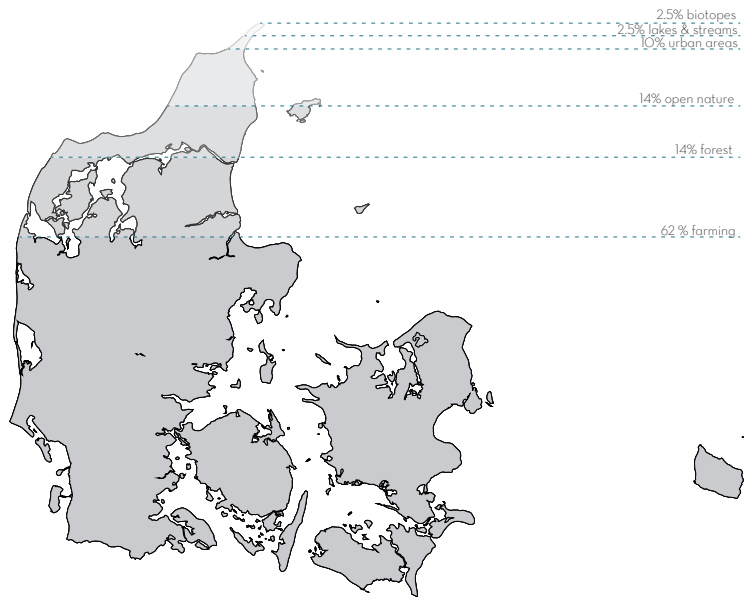
**The project will investigate the possibilities of creating a new strategy for the farming industry.** A strategy that can combine different types of land use in ways to make the countryside more accessible for the residents, as well as more environmentally and economically sustainable for the farmers.

The strategy will be developed in the context of Lolland south of Sealand, which consist of 86% very fertile land, but also very expensive.

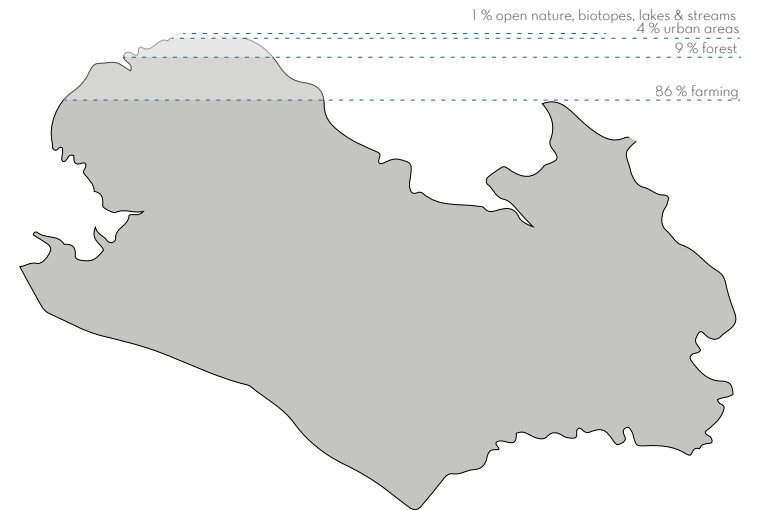
Building on the municipal strategy of Lolland, the project will develop the farming industry in combination with the tourism industry, emphasizing existing qualities of the island.

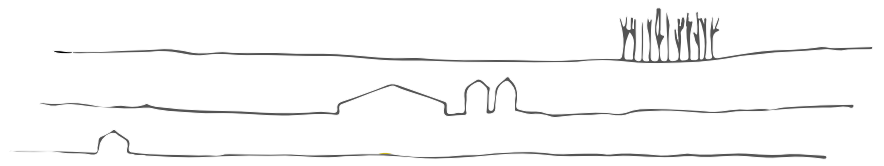
The aim of the project is a strategy that will combine site specific qualities with issues related to the farming industry; enabling farmers to develop their farm, securing the drinking water resources, securing biodiversity of the Danish nature, and bringing back nature to the inhabitants of Lolland, as well as strengthening the tourism industry.

Land use of Denmark



Land use of Lolland





Today, living in rural Denmark means living in a pig producing industry. Miles of fields, industrial buildings and patches of trees.



## danish farming

Historically, Denmark has for many years been a farming country. The land is flat and fertile, so it is relatively profitable to produce crops.

With the industrial revolution the industry optimized as people moved to the urban areas.

The first major crisis was in the 1870's where the international price on cereal products dropped. **The danish farmers were forced to restructure, and this led to livestock production, including eggs, dairy products and meat.**

A few decades later the cooperative movement was born. The farmers joined together in dairies and slaughterhouses to lower the cost, and the cooperative movement became very influential on the development of the Danish society. After years of war and instability the establishment of what we today know as the EU was the beginning of the CAP. The CAP (The Common Agricultural Policy), introduced in 1962, which has been reformed several times, has been one of the most influential aspects of the Danish farming industry.

The CAP was one of the first EU policies and was created to ensure the citizens of Europe had good quality, affordable food, and for farmers to be able to make a fair living.

In the 1970-1980's the productivity of the European farmers was so high that there was too much food produced, resulting in mountains of stored food to control the price on the market.

In the 1990's the CAP shifted focus to the quality of the produce and legislation on organic farming. The latest reforms of the CAP focused on the decrease of direct payment to landowners, and since 2000 the Rural Development Programme has been a part of CAP, which aims to stir the economic, social and environmental development in the countryside. **The farming industry is faced with shrinking aid from the CAP through the EU.**

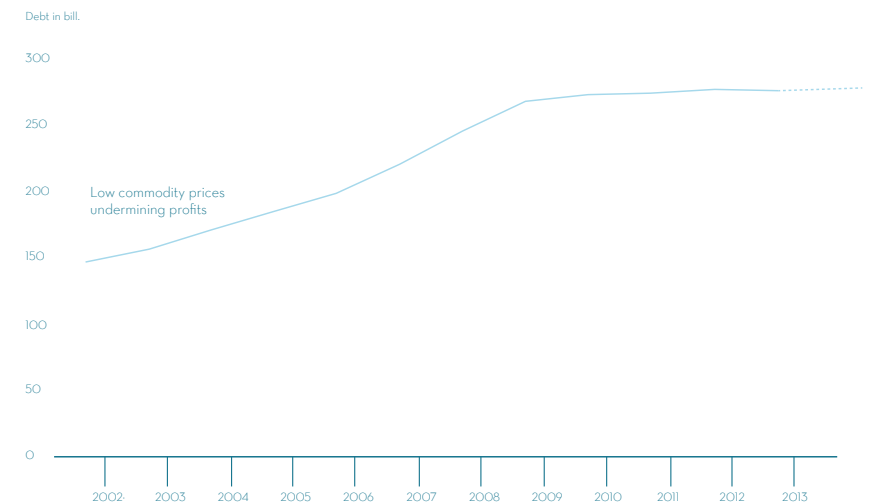
The general strategy is based on the subsidies relating to the land size combined with the advantages of mass production. This is putting farmers in competition with

low wage countries, resulting in a growing debt for the farmers, and a loss of money due to producing goods on expensive soil.

This strategy has resulted in a growth of the size of farms from approximately 400.000 farms back in 1967 to 40.000 today, resulting in much larger estates than earlier (see graph). Today, two thirds of the farmed land is occupied by farms over 100 hectares, and these large farms have resulted in a market where it is harder for young farmers to establish.

The growing farms have amplified the ongoing issue of capital shortage for young farmers to buy their first farm.

Debt of the farming industry



Though schemes like The Young Farmers Loan and The Establishment Loan were created to target this issue, young farmers are still facing problems of getting loans from banks due to the instability of the industry.

Besides the fixed position for farm owners, large farms make investments and conversion to organic farming or other alternatives very costly, and sometimes not possible.

Agriculture economists are pointing to organic farming as a way out of the crisis, since the operating profit is higher than with conventional farming (see graph).

The industry is facing an even more unstable future, where the subsidies from the EU can no longer save the shrinking income.

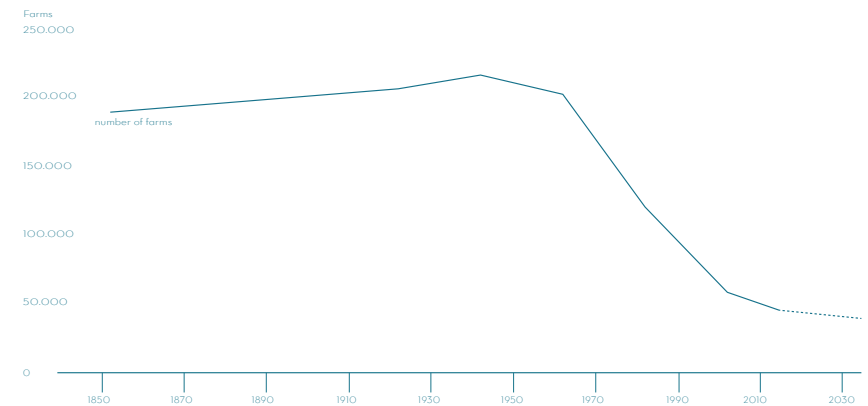
The current government's solution is easing restrictions on polluting and fertilizing, enabling the farmers to produce more goods, stressing the danish environment.

**Researchers within the field are calling for a new approach to solve the Danish farming crisis, stating that the ease of the pollution and fertilization is using the same strategy as the last forty years, which has proven to fail.** The strategy promotes producing more goods per hectare and minimizing the cost to be able to compete with low wage countries like Poland and Spain.

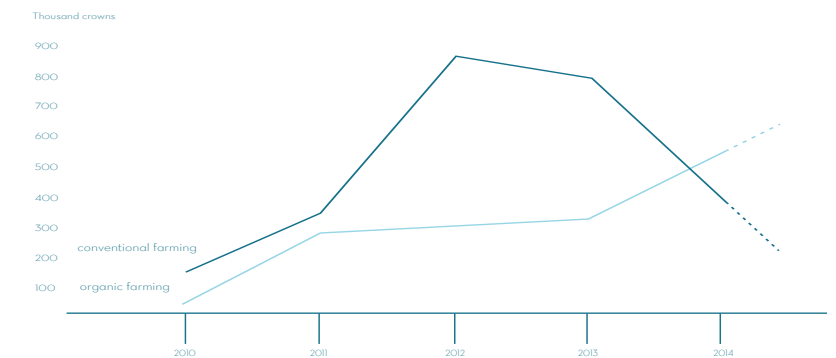
One product of the development of the agriculture industry is a surplus of farm buildings. It is estimated that 67 mio. m2 of buildings are unused. There is an assessment system currently being developed that will determine which buildings are worth preserving, and the current estimate is that 45 mio. m2 of buildings are worth preserving.

Though the industry today in terms of production and employment can be regarded as a profession with marginal importance, the importance of the development of farming is immense. **The industry occupies two thirds of the land in Denmark and developing the industry will have a major influence on the appearance of our countryside, as well as the wellbeing of our ecosystem.**

Number of farms in Denmark



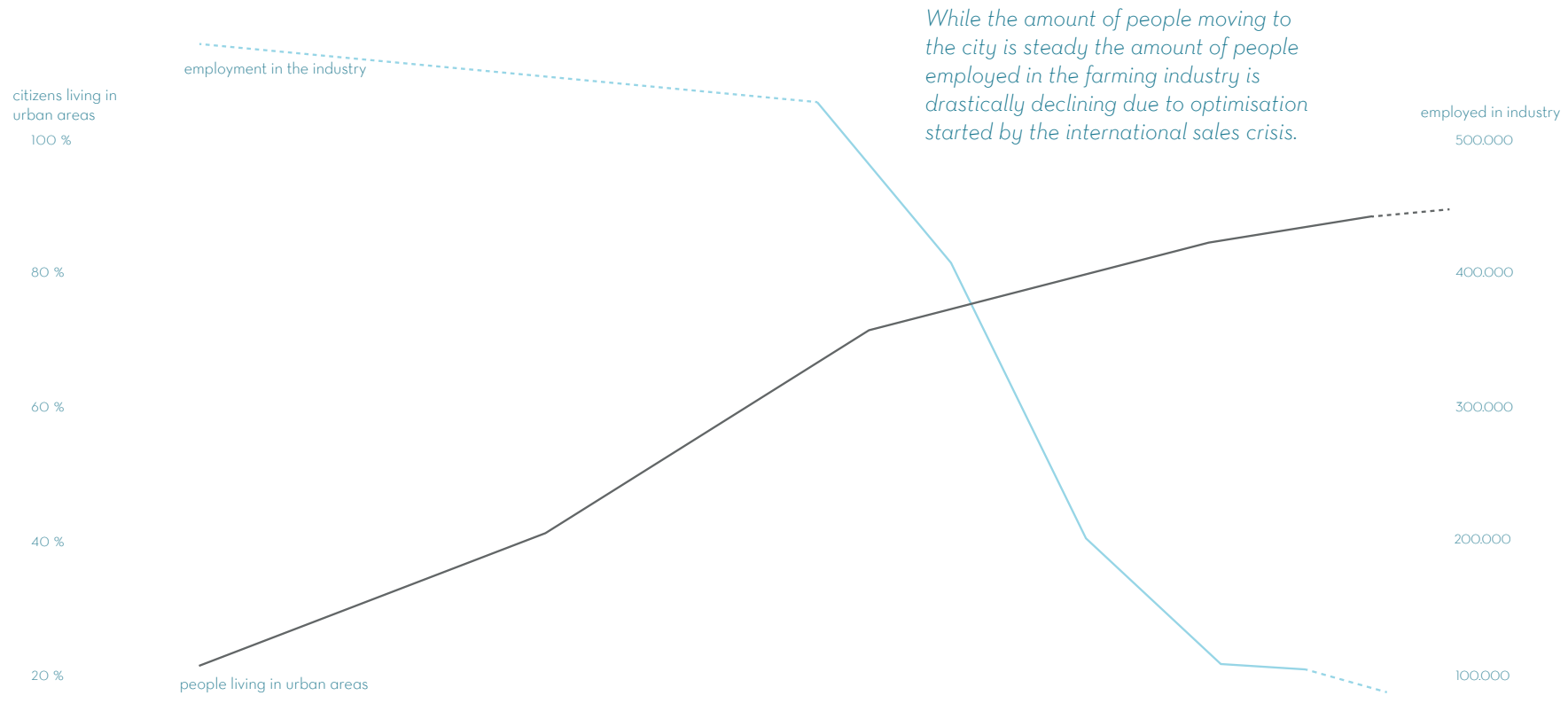
Operating profit



*"Agriculture will continue to play a central role in landscape use, but it will increasingly interact with recreation and nature, like settlement and tourism are important issues in rural policy. There is therefore a need for the future landscapes to be configured as more multifunctional, but here we lack knowledge and experience on how it can happen."*

*Jørgen Primdahl, Professor, The Department of Geosciences and Natural Resource Management*





1850

1870

1890

1910

1930

1950

1970

1990

2010

2030

1861-1881: An area the size of Fyn is dammed and farmed, including Kolindsund, Rødby Fjord and Lammefjord

1870's: Decrease of price on cereals, which the majority of the Danish farmed land consisted of. The farmers were forced to reorganize the production. Converted into animal production, including butter, eggs and bacon.

1880: Cooperative movements arise

1920's: A combination of the opening of international markets and tariff barriers is lowering the price of agricultural product. Agriculture manages to optimize and increase production, which unfortunately is flooding the market with products that make prices even lower.

1962: EU introduces agricultural policies

1992: Shift in the policy to support the product instead of market

1990's: Policies is on organic farming is created

2014: Ministry of environment and food decides to relocate 30 % of the subsidies to "landdistriktpuljen".





# Lolland

The island Lolland, situated in the southern part of Denmark, and part of “udkants-Danmark” has 60.000 inhabitants. The island, also called the pancake due to the very flat character consist of 86 % of cultivated land. Large parts of the land is dammed to be used for crops.

The majority of the agricultural production on Lolland consist of sugar beets and pig feed, although the soil is very rich on Lolland, the farmers are still struggling. The national trend of fewer and larger farms also a trend on Lolland, and due to the structural changes, you also see many unused agricultural facilities in decay. On a national level, the “Landbrugspakken” is easing restrictions on pollution in agricultural businesses.

In the current municipal plan (Kommuneplan 2010-2022) of Lolland, there is special attention placed on the possibilities of tourism. **The tourism industry in Lolland municipality has been growing in recent years and there is a tendency of jobs shifting from the agricultural industry to the tourism industry.** Lolland is the destination in the region of Sealand with the largest number of nights spent in hotels, hostels and more (see graph).

The future Fehmarnbelt connection to Germany presents a great opportunity for Lolland to establish itself as an international tourism destination.

In relation to the tourism industry, the plan is focused on creating areas for holiday cottages, preserving sites of cultural heritage and securing larger undisturbed landscapes.

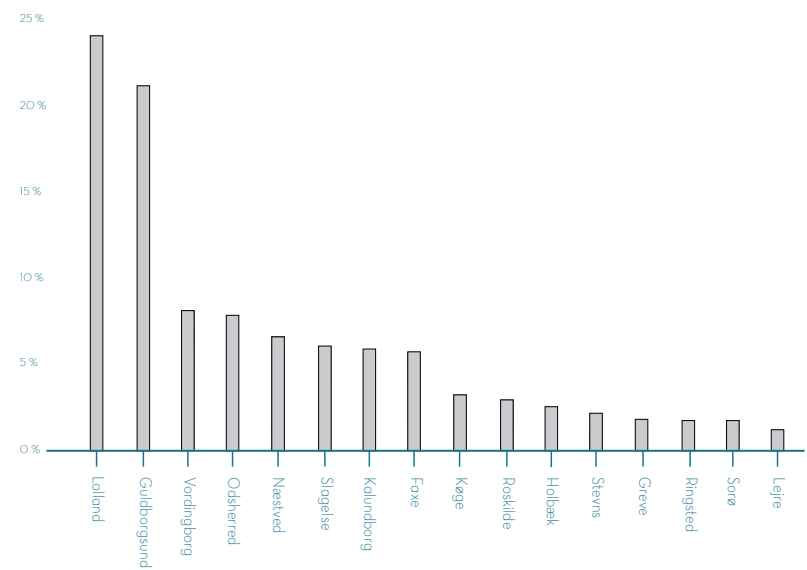


The many kilometers of coastline is one of the most valued qualities of Lolland. The current government also sees the coast as an asset for the Danish countryside and the plan law is currently being amended to enable activities on the coast. Dispensation has been awarded to ten projects to build on the coast, which has been prohibited since 1993, and fifteen additional project are planned to be granted. A project from Lolland consisting of holiday cottages is among the first ten projects the government has allowed to build on the Danish coast. The project, Safari Lodge Knuthenborg, is a project of 200 units on and near the northern coast of Lolland.

Instead of focusing the development on the coast, planning new urban sprawl on the coast and near existing towns, why not protect the coast and its qualities, and use the existing structure of the land?

**Why not focus the development of nature on Lolland and enable the residents to live in the countryside close to actual nature?** Why not connect the coast better to the rest of the island, emphasizing other qualities of Lolland?

Nights spent in region of Sealand





Today all focus is on the qualities of the coast, though wherever you are on Lolland, it is rarely more than 10 km to the coast. Why not focus on protecting the nature on the coast and connect the inland areas better to the coast, emphasizing other qualities of Lolland?

Current focus on tourism in the municipality



Proposed future focus





*"The 7,300 km coast of Denmark contains a variety of landscapes, which holds a special position in an international perspective. This is something we can be proud of and something we have an international responsibility to take good care of."*  
-Svend Auken, Environmental & energy minister 1994.

## reforestation



Today, forest is the most visited recreational space in Denmark, with 75.000.000 visitors each year. About 14 % of Denmark is covered by forest, and national goals state that the amount of forest in Denmark must grow to 25 % of the land within the next century, in order to support biodiversity of danish nature, drinking water resources and recreational areas.

By the municipality areas of reforestation are designated, which grant permission to apply for national grants for reforestation. The areas identified on the basis of three main objectives; securing drinking water interests, peri-urban recreational areas and green networks. Land where reforestation is not possible includes landscapes with scenic values, geological or historical sites.

**In a socio economic perspective a reforestation or nature restoration project will be a worthy investment, due to the improvement of the recreational areas and a higher quality of life for the resident of the area, as well as the value of carbon dioxide binding, clean ground water and a higher degree of biodiversity.**

Studies of forest and nature restoration have shown an increase of the prices in proximity to the restoration project, typically the increase is 5-23%, which the municipality profits from through higher land taxes.

The cost of reforestation is relatively high. Usually reforestation is done on farmed land, which means that the income from the farming is lost, and during the first decades there are large costs of planting and making paths. It is possible to get granted subsidies when doing a nature restoration project, both from national and international channels, though it will only cover a fraction of the total cost.

The costly restoration projects are often conducted by a range of stakeholders who join together, typically these could be the municipality, the Danish Nature Agency, private landowners and local water suppliers.

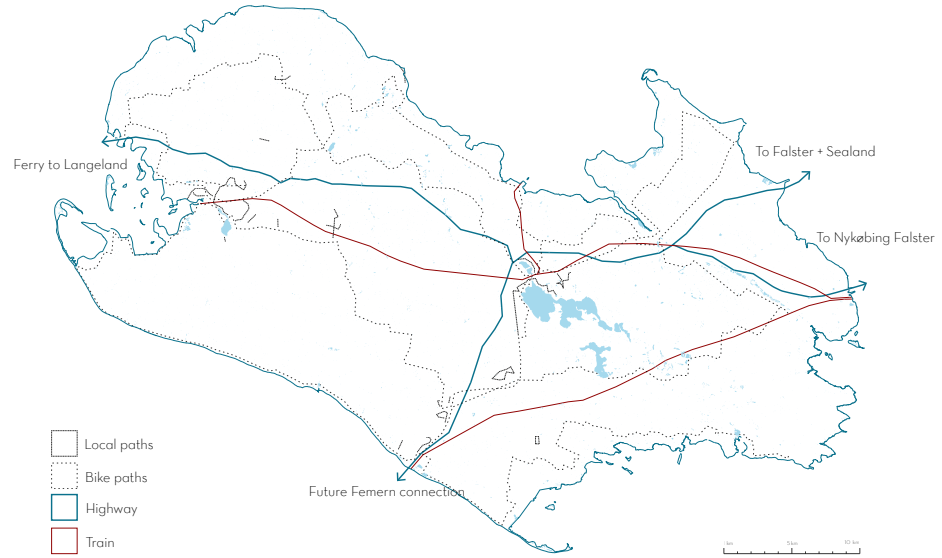
*"People say that Denmark is a culture landscape.  
We have no wild nature. It is abolished, and we  
should not have again. But why not?"*  
Hans Henrik Bruun, biologist



mappings

*infrastructure*

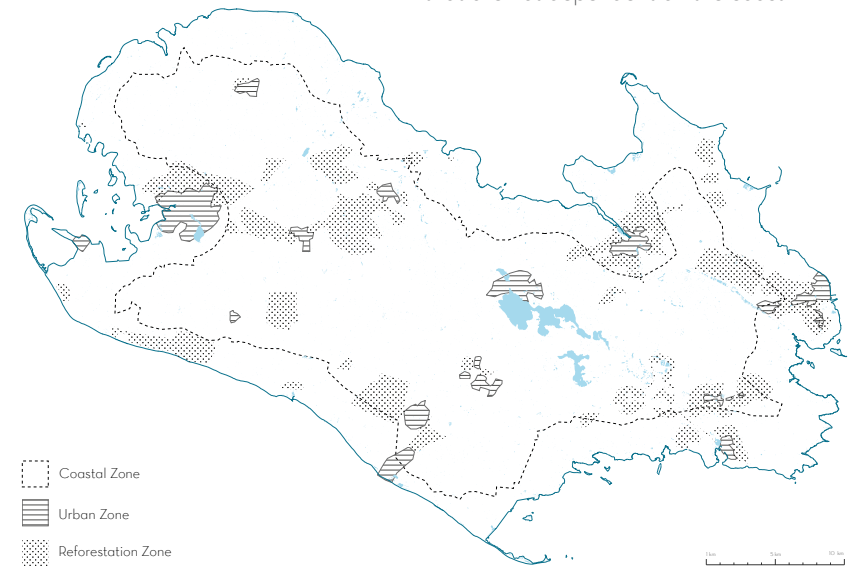
Maribo is a focal point on Lolland. The international highway runs past, going to Rødby and Germany and north to Falster and Sealand. The train line runs through, going to Nakskov, Rødby and Bandholm.



## *zoning*

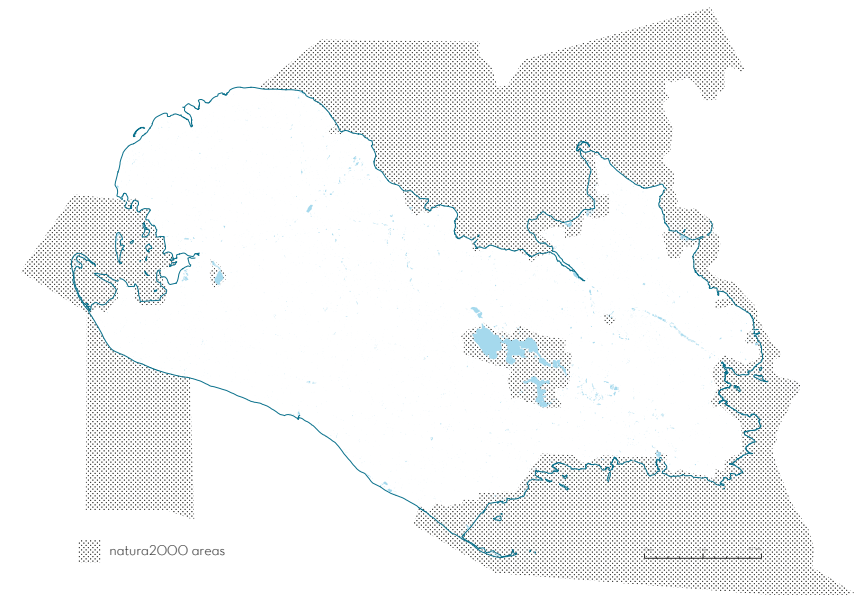
The zoning of Lolland shows the small towns scattered over Lolland. Currently, the areas for reforestation are identified from the regional plan, and the areas for reforestation are quite few. The municipality is working on a plan with more and larger areas of reforestation.

The coastal zone is an area that should be kept undeveloped for constructions that are not dependent on the coast.



## *natura 2000*

The majority of the coastline of Lolland is protected by Natura 2000. Especially the bird wildlife has excellent living conditions, which is internationally acknowledged by the identified Natura 2000 areas. The coast of Lolland is significant and needs to be preserved it also has a quality that the tourism industry can benefit from.



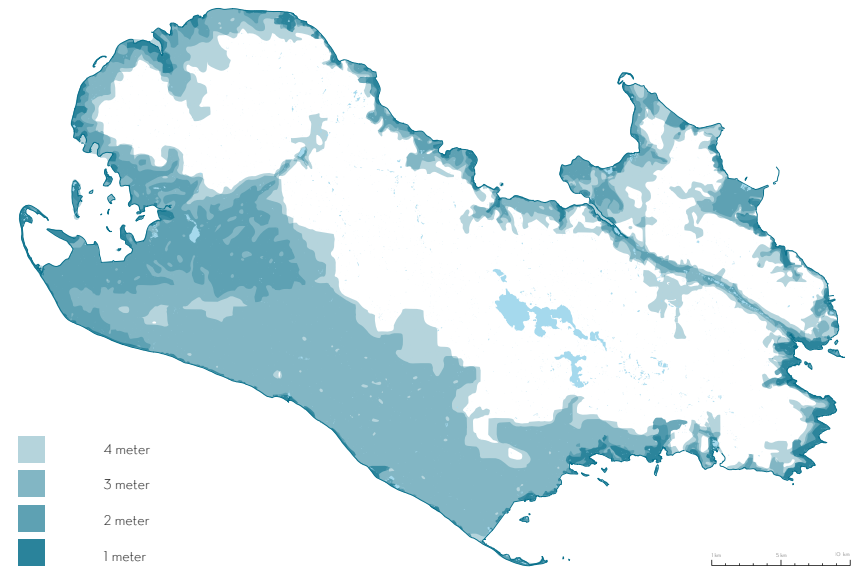
Natura 2000 is a coordinated network of protected areas in 28 EU countries. The areas are a habitat or future habitats for Europe's most valuable and threatened species. The Natura 2000 network ensures the survival of the selected Natura 2000 areas. For each Natura 2000 area there is developed a plan, which will protect the area against activities that can possibly threaten the nature and the viable populations.



## rising sea levels

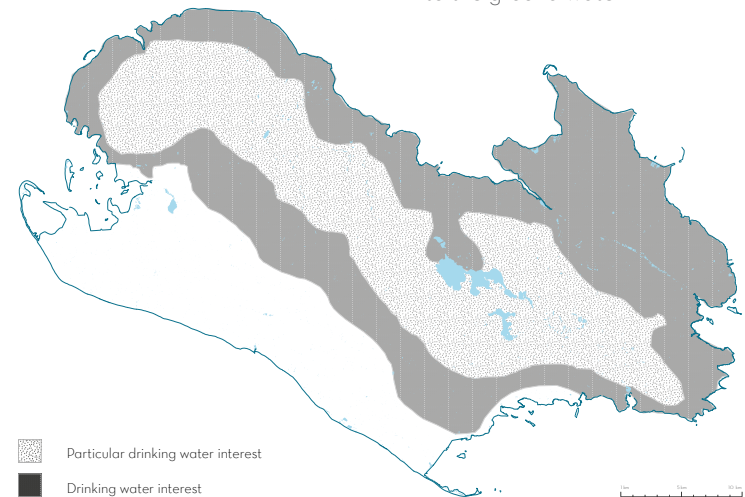
In the future the rising sea levels will flood large parts of Lolland. Though some of the flooding is expected to be prevented by dikes, this should still be taken into consideration.

Graph showing where Lolland will be flooded when sealevels rise 1,2,3 and 4 meters.



## drinking water interests

Looking at the drinking water interests of Lolland, it is clear that the majority of the use of the land has an influence on the future drinking water supply. Water suppliers in such areas are often interested in securing the drinking water by changing the use of the land. An example is financial support for re-forestation, where there is not used any fertilizers or pesticides that are threats to the ground water.



## *pesticides in groundwater*

The impact on the groundwater caused by pesticides in farming.

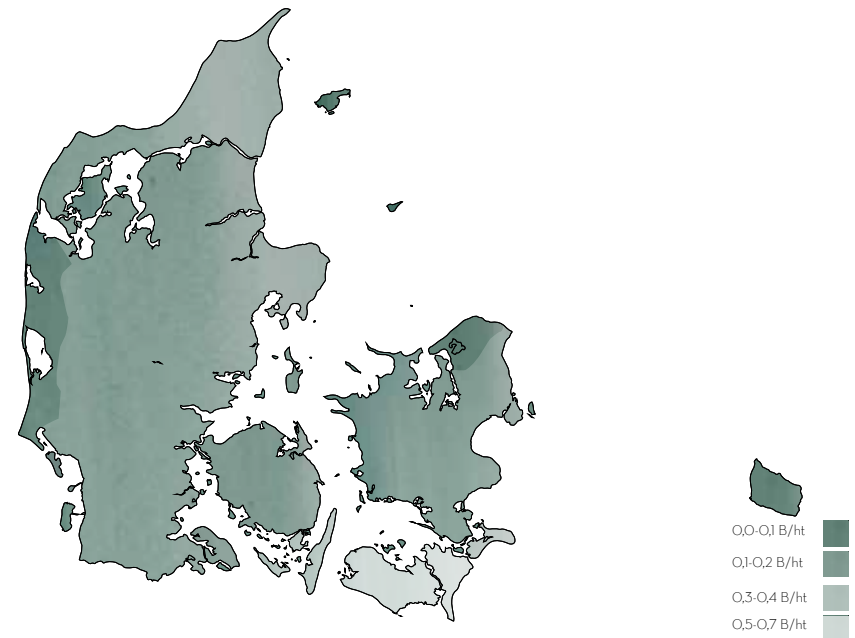
Numbers from mandatory reports from farmers. (B/ht)

The critical numbers of Lolland may be due to the large amount of sugar beets produced, where large amounts of pesticides are used.

The map shows the pesticides degree of impact on the groundwater in regions of Denmark. The map is based on mandatory data on the use of pesticides the farmers has reported the last three years.

The degree of impact is high in Lolland and is partly due to the type of crop mainly grown there, beets. In beet production there is often used more pesticides to kill weed between the beet rows.

Though the use of pesticides are high on Lolland, the impact on groundwater might not be as large here, because of the soil quality. The soil has a high content of clay, making it harder for pesticides to percolate, but instead led into nature through the many drains on Lolland.



## intention

Working through three thematics; tourism, farming and reforestation the project will develop a site specific answer to the struggling farming industry.

The intention of the project is to develop a vision for the farming industry, taking a starting point in the existing strategy of Lolland to develop the tourism industry, both relating to recreational areas and holiday housing.

A configuration of land use will be developed creating a green belt connecting Maribo to Bandholm and the coast.

In relation to the planned area, the project will envision how the farming industry can apply neglected unused farm buildings by reprogramming them to be used for tourism purposes.

The projects will be developed on three levels; the strategic level, the structural level and a zoomed in level.

# Deliverables

strategic



Strategic Plan 1 : 75.000

Structural Plan 1 : 20.000

Zoom in in relevant scales

Diagrams

Visualisations

All scales are guiding, and may be changed.

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## education

9-10. semester: Urbanism & Societal Change

8. semester: Exchange at RMIT, Australia

7. semester: Internship at Alex Poulsen Arkitekter

2-6. semester: Department 1; Architecture, City & Landscape

1. semester: Department 2; Architecture, City & Building



