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POTENTIAL FOR URBAN AGRICULTURE ON FORMER FARMLAND AT BREDTVET AND GAUSTAD, OSLO

A study of soil resources, current land use, and users' and stakeholders' desires and perceived challenges



Cristina Gil Ruiz
Soil Section



2015
International
Year of Soils



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TITLE

POTENTIAL FOR URBAN AGRICULTURE ON FORMER FARMLAND AT BREDTVET AND GAUSTAD, OSLO: A study of soil resources, current land use, and users' and stakeholders' desires and perceived challenges

AUTHOR

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SUMMARY:

Oslo has experienced an increase in the number of urban agriculture (UA) projects and growth in public interest. The study investigated how user groups could carry out UA projects in two apparently unoccupied plots of former farmland: Bredtvet and Gaustad. Soil characteristics, current land use, users' desires, and the challenges they perceived for the development of UA projects were studied. It seems possible to integrate UA projects in both areas without disturbing current land uses, thereby leading to the recuperation of the soil resources of the former farmland. UA can have multiple purposes, such as food growing, social integration, community building, and health improvement. Major challenges hindering UA projects result from lack of institutional support and funding.

COUNTRY:	Norway
COUNTY:	Oslo
MUNICIPALITY:	Oslo
LOKALITET:	Gaustad, Bredtvet

APPROVED

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FOREWORD

The project was initiated by Cristina Gil Ruiz's wish to contribute to the United Nations International Year of Soils 2015 and her idea that was presented to Arnold Arnoldussen, Head of the Soil Section at the Norwegian Forest and Landscape Institute, in early 2015. The concrete project was subsequently developed in close cooperation with the Department of Agriculture at the County Governor of Oslo and Akershus and with the Norwegian public property management authority (Statsbygg). The project period was June to November 2015. On behalf of NIBIO, I express gratitude to all those who have contributed to this report, and I hope that the results will be used to develop urban agriculture further in Oslo and elsewhere.

Ås, 2 December 2015

Sebastian Eiter, Dr.polit.

(Research Scientist, Project Leader)

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ABSTRACT

Soil sealing is a major threat to soil resources in Europe and worldwide. Increasing urbanization has a direct impact on soil resources within the cities. Oslo conserves former farmland that has been maintained despite urbanization process. Urban agriculture (UA) is expected to have the potential to become a principal element in urban planning because it can provide multiple social and environmental benefits.

The study explores the potential for UA projects at Bredtvet and Gaustad, two former farmland areas, by focussing on (1) soil quality, (2) current use of the land, and (3) users' and stakeholders' desires and perceived challenges to the development of UA.

Gaustad users and stakeholders imagine the area with concrete infrastructure, a pollinator corridor, an edible garden, and conservation of all currently existing land uses. UA projects and other ideas promoting biodiversity are embraced in their visions.

For Bredtvet, it was quite challenging to collect data from user groups. Future initiatives might therefore profit from including a participatory approach and visioning workshops. Nevertheless, a UA visioning space was created based on soil characteristics, sociological analysis and other UA projects.

Oslo may profit from greater consideration of UA. UA may have the potential to become a key strategy in city planning. Improved dialogue and collaboration among public institutions, citizens and the private sector would be required. Departments within public agencies may consider the potential of UA in various respects, such as social, physical, and psychological. Increased funding and more permeability among different sectors in bureaucracy might help Oslo to become a leading sustainable city, where dynamic structures allow for substantial social participation in urban planning.

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I express my gratitude to Arnold Arnoldussen for his persistence in making the project a reality. Thanks are also due to Sebastian Eiter for all his patience, professionalism, German humour and comments, which have improved the quality of this report. In addition, I thank Siri Svendgård-Stokke, Head of NIBIO's Soil Section from 1st July, for always being so caring and supporting at a professional and personal level.

Hilde Herrebrøden and Ellen Marie Forsberg are thanked for their support, for always have a receptive attitude, and for persisting on their urban agriculture path. I also thank Eivind Solbakken for the knowledge that I have acquired about soils, as well as Roar Lågbu and Åge Nyborg for their work with the soil thematic maps. All colleagues at the Soil and Landscape Monitoring sections at NIBIO are thanked for giving me a warm welcome and integrating me into their working environment, and for their interest in this project.

Finally, thanks are due to participants in COST Action Urban Agriculture Europe, to Jesús Mesanza and Juan Carlos Escudero from the Environmental Centre at Vitoria-Gasteiz (Basque Country, Spain) and to the persons behind all the UA examples that I have discovered in this research, for their inspiration and work towards the creation of sustainable realities. Fernando López Domínguez is also thanked for his care and support during this research.

INTRODUCTION

Urban agriculture (UA) embraces multiple activities around growing food in an urban context. In some cases it acts as a channel for social insertion, health improvement, and for treating depression (Bellows et al. 2004; Gonzalez et al. 2010). UA is seen as a key strategy for the development of sustainable and functional metropolises in the future, since it provides multiple benefits within basic services for citizens (Arosemena 2012).

Urban agriculture has existed in Oslo for a long time, although 'urban agriculture' as a concept is recent. COST Action Urban Agriculture Europe recognized two main categories of UA: urban farming and urban food gardening, which together comprise 14 subcategories (Simon-Rojo et al. 2015). Urban farming implies a business model adapted to take advantage of the proximity to the city by selling local products or providing local services, whereas in terms of the economy urban food gardening is usually not dependent on products and may include a stronger social element.

The meaning of soil in the city

Soil is a vital part of the living conditions on our planet. The year 2015 has been declared the International Year of Soils by the United Nations. Soil is considered to be a non-renewable resource because its recuperation is possible on a geological scale, not on a human scale (Jones et al. 2012). It takes a long time for a high quality soil to develop, and a political decision alone can be enough to destroy it.

Together with water, air and light, soil is the basis of life on earth (Carson 2012). However, societies still lack awareness about the implications that destroying soils has for human well-being. The possibilities that fossil fuels offered in the 20th century and the externalization of the social and ecological impacts of capitalism may have caused the importance of healthy soils to be overlooked. Soil care has been neglected because it interferes with many development strategies. For example, rural farmland on the periphery of urban areas is easily sealed in order to build facilities (Vives and Rulan 2014).

In Europe, soil sealing is one of the biggest societal practices threatening soil resources (Jones et al. 2012). Soil resources are often sealed in order to promote economic growth by creating employment facilities. Some people maintain that an applicable measure to counteract soil sealing is the relocation of high-quality topsoil in other areas. This idea is at the experimental stage and assumptions cannot be made without longer term scientific research. Moreover, understanding city metabolism and integrating ecological principles in the social and economic aspects of urban areas are of key importance for building resilient societies (Barthel and Isendahl 2013).

Oslo and urban agriculture

In 1998 the City of Oslo developed a comprehensive sustainability policy: the Urban Ecology programme ('*Byøkologisk program*'; City of Oslo 2013). Following this initiative, Oslo

Municipality has worked out a strategic plan for creating a 'Smart, Safe and Green' city with the ambition to be a world leading sustainable city, and therefore works towards large reductions in greenhouse gas emissions (City of Oslo 2013). The Oslo strategic plan aims to manage the city's biodiversity in a sustainable way and preserve both natural and cultural heritage while promoting Oslo's blue-green structures (Oslo kommune 2015).

Historically, vegetables were introduced to Oslo gardens by aristocrats in the 19th century (Marianne Leisner, pers. comm, 2015). Allotment gardens (*parsellhager* and *kolonihager*) and school gardens (*skolehager*) were part of Oslo's landscape, enabling residents to preserve their knowledge of cultivation and offering outdoor recreational activities for families without such possibilities at home. However, different expressions of urban agriculture were dramatically reduced with the introduction of mechanized agriculture and industrialization after World War II (Leisner 2014).

Armed with an understanding of negative impacts that industrial farming has had on nature since the late 20th century, several groups of people started to try to bringing back horticultural knowledge to Oslo. Many citizens would like to know more about growing food (Marianne Leisner, pers. comm.). In other cases, UA practitioners are mainly interested in the economic benefits that growing their own food has compared to buying it. Nevertheless, both social and health aspects are considerable components of people's appreciation of UA projects (Veen 2014).

Since 2012 Oslo has experienced a rapid increase in the number of UA projects (Leisner 2014). Examples include MaJoBo and Oslo's participation in URBACT's sustainable food network in urban communities. There are long waiting lists for some allotment gardens and city dwellers have welcomed more recent UA projects such as Herligheten Allotment Garden at Bjørvika and the Nabolagshager project at Grønland, both of which are neighbourhoods in Oslo.

About the research

A think tank on urban agriculture was initiated by the Department of Agriculture at the County Governor of Oslo and Akershus (FMOA-LA). In that think tank, representatives from Statsbygg, Oslo County, grass-roots' movements (Bybi, MaJoBo, and Parkens Grøde), Oslo Municipality, NIBIO, and other institutions met. A representative from Statsbygg mentioned two locations that could potentially accommodate UA projects. The Soil Section of the former Norwegian Forest and Landscape Institute (Norsk institutt for skog og landskap) envisioned the possibility of creating a pilot project based on these two case studies.

The research presented in this report focused on two plots of former farmland: one in Bredtvet and the other in Gaustad. These two neighbourhoods in Oslo (areas) are on public land that is currently owned by Statsbygg. The leading question of the research was: What is the potential for developing urban agriculture projects in Bredtvet and Gaustad areas? To answer that question I studied the soil resources, current land uses, and the opportunities and challenges perceived by stakeholders and users. A preliminary proposal for assessing the suitability of sites for UA was formulated as presented here, together with the specific results for Bredtvet and Gaustad.

METHODS

Study sites

Research was conducted in both Gaustad and Bredtvet. Gaustad is located in the northern part of Oslo and Bredtvet in the north-eastern part (Fig. 1). Both areas are considered to be near to Marka, a forested hilly area, and thus there is potential interest in them being preserved as green areas.

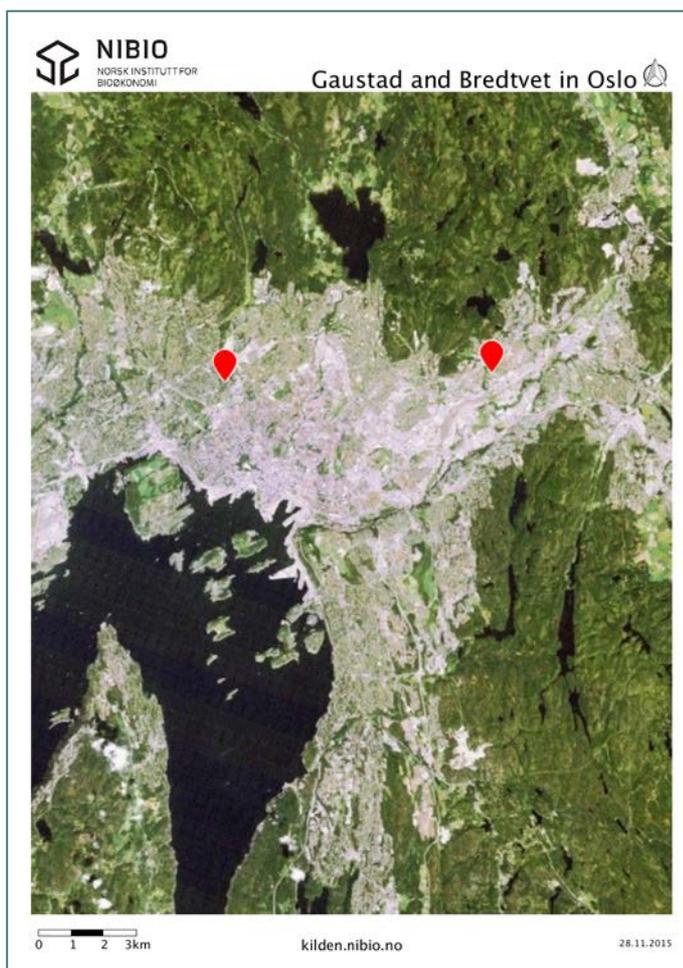
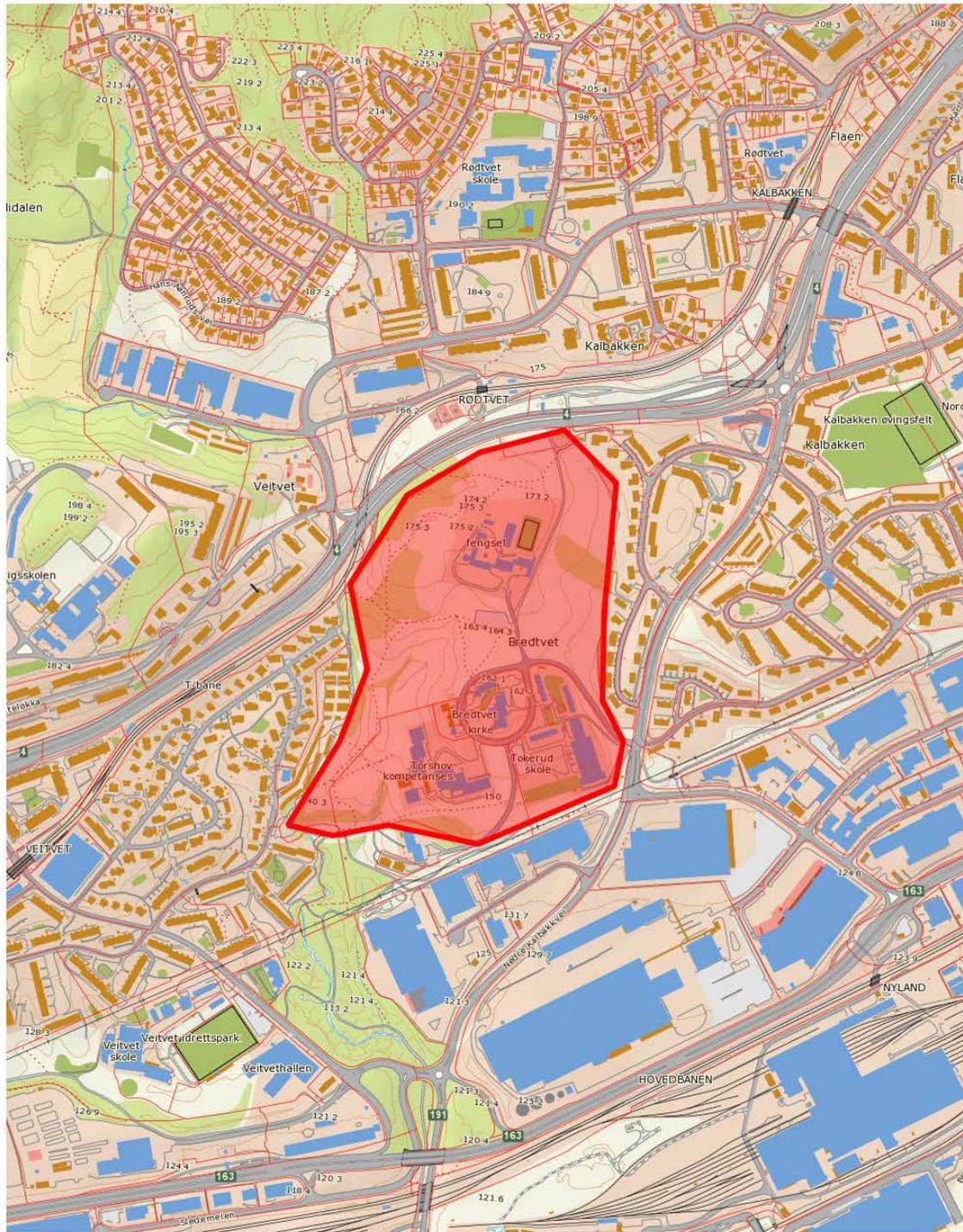


Figure 1: Location of Gaustad (west) and Bredtvet (east) in Oslo.

Bredtvet

Bredtvet is located in Bjerke District, within Groruddalen valley. In this report, the terms 'Bredtvet land' or 'Bredtvet area' refer to the non-urbanized area that surrounds Bredtvet women's prison, Statped, a church, and two kindergartens. Bredtvet area is delimited by housing in the east (Kalbakken) and west (Veitvet), Trondheimsveien highway in the north, and private commercial buildings in the south (Fig. 2).



0 100 200 300m

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Figure 2: Bredtvet area (marked in red).



Groruddalen valley used to be farmland and it experienced a dramatic transformation during the second half of the 20th century. At that time, housing and industrial areas were progressively settled in Veitvet and a vibrant ‘satellite town’ was developed.¹ Figure 3 shows fields both around the prison and within its perimeter fence. Today, Bredtvet land is considered industrial land and therefore it is possible to build on and urbanize it.

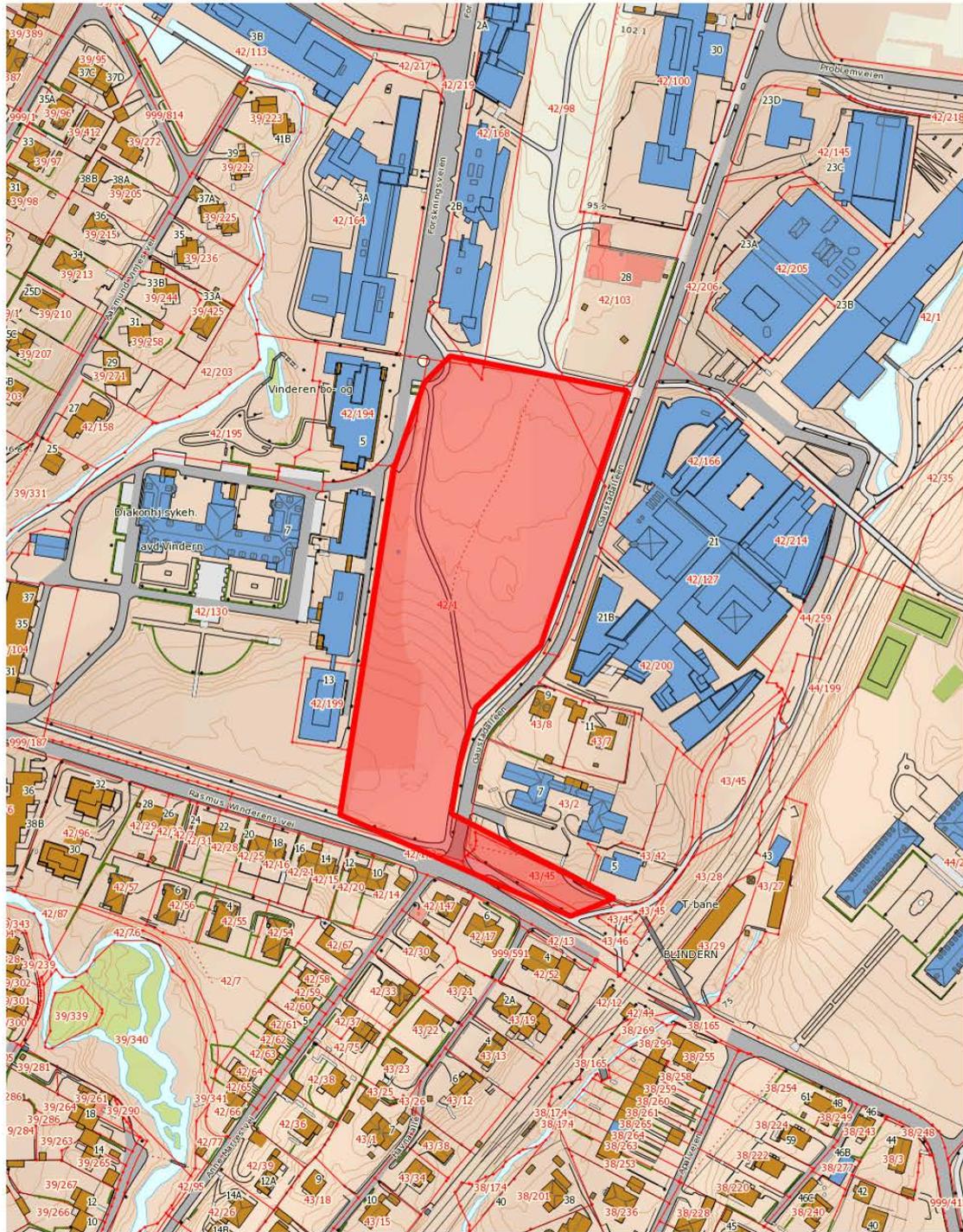


Figure 3: Bredtvet in 1962. (Source: <http://oslobilder.no/BAR/A-20027/Uc/0001/615>).

Gaustad

‘Gaustad land’ or ‘Gaustad area’ is located south of the former Gaustad psychiatric hospital. Gaustad is located on the boundary between the districts of Nordre Aker and Vestre Aker, in northern Oslo (Fig. 4).

¹ An example is the inauguration of what was then the largest shopping centre in Northern Europe, at Veitvet in 1958 (Bjerke Bydel 2012).



0 20 40 60m

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Figure 4: Gaustad area (marked in red).



In the past, Gaustad psychiatric hospital grew food for its own consumption and patients participated in the task (Tore Faller, pers. comm. 2015). Figure 5 shows the farmed fields near the hospital in 1926. Today this area has experienced an ongoing transformation since the development of the University of Oslo, Rikshospitalet, and more recently Forskningsparken.



Figure 5: Vinderen Psychiatric Clinic and Gaustad area (encircled) in 1926 (Photograph: Anders Beer Wilse; source: <http://oslobilder.no/OMU/OB.Y2997>).

Gaustad land is near to Blindern metro station and it is surrounded by detached family houses with private gardens to the south, public institutions to the west, public and private institutions to the east, and a park to the North.

Data collection

In order to explore what UA projects could be developed at Bredtvet and Gaustad, this study focuses on three distinct aspects: (1) soil quality, (2) current land use, and (3) users' and stakeholders' desires and perceived challenges to developing UA. These aspects can be regrouped into two general topics: soil analysis and social analysis.

Soil analysis

The land in Bredtvet and Gaustad was surveyed by taking multiple auger samples. The full depth of the upper soil layers were investigated by taking four or five 15–20 cm sample from each auger hole (Fig. 6).



Figure 6: (left to right) topsoil layer in an auger, an auger hole, and data digitalization (Photos: Cristina Gil Ruiz / NIBIO).

The soil properties were determined in accordance with a classification key used in Norwegian soil surveys, which is based on the World Reference Base for Soil Resources (WRB units 2014 (FAO 2015)). The classification key takes into account the type and properties of the topsoil (Ap horizon), natural drainage of the soil, the type and properties of the horizon below the topsoil, depth to bedrock or other impermeable horizons, texture and content of coarse fragments (gravel $\geq 2\text{mm}$ and stones), and human disturbances. Based on the observations, the WRB unit for each auger hole was determined.

The position of each auger hole was digitized in the field by using a field PC with digital orthophoto and GPS. Based on the WRB units of the different auger holes, map units were established using the most common WRB units for different areas. In addition, a texture class for the top soil (Ap horizon) of each map unit was determined. The borders between the different map units were partly digitized in the field and partly in the office later by interpreting the auger observations. Slope was measured in the field and each map unit was assigned one of three slope classes: 0–6%, 7–20% or 21–33%. No chemical or physical analyses were performed.

At Bredtvet, an area of 10.6 ha was mapped. A total of 40 auger points were registered, resulting in four different WRB units. At Gaustad, a total of 2.1 ha was mapped and 20 auger points were registered, resulting in five different WRB units (see Appendix 1).

Social analysis

There are two main lines in the social analysis: the current land use and the desires that users and stakeholders have for these areas and the perceived challenges to developing UA projects. Information from national and international UA projects has been analysed in order to broaden the opportunities for Bredtvet and Gaustad areas.

Current land use

Transect walks in the area, informal interviews with persons passing by, and semi-structured interviews (see Appendix 2) with user groups' representatives were applied to find out about current land use. The interviews were recorded and notes from the informal interviews and transect walks were collected in a field notebook.

Official documentation and semi-structured interviews were used to collect data about the desires of the user groups and about the ideas that UA stakeholders in Oslo currently had for Bredtvet and Gaustad lands (see Appendix 2). During the interviews, users were asked to speak freely about their desires and visions for Bredtvet and Gaustad lands. The envisioning exercise focused on UA activities, yet the interviewees were asked to imagine any type of activity. The purpose of the exercise was to allow the interviewees' imagination flow and to gather as many ideas as possible.

In order to find key stakeholders in Oslo (Table 1), I attended a UA think tank meeting in June 2015. In addition Internet searches and further contacts with relevant stakeholders were used to find stakeholders.

A mix of Internet searches and personal knowledge of successful projects was used to find projects of an exemplary character at national and international level.

Table 1: Key stakeholders.

Competence	Name (affiliation)
UA project leader	Helene Gallis (Nabolagshager, MaJoBo)
Psychiatric nurse, public health and green care expert	Marianne Thorsen Gonzalez
Oslo school gardens' coordinator, UA project leader	Tore Faller (Geitmyra)
UA project leader	Marianne Leisner (Garteneriet, MaJoBo, Gaia)
Landscape architect, UA consultant and project leader	Agnes Melvær (Bybi, Abelshage)
Agroecologist, UA promoter	Line Tveiten (Bymiljøetaten)

It is necessary to bear in mind the concept behind the term 'green care'. In Norway, green care is often closely linked to farm activities (*Inn på tunet*). However, it is also used in a broader sense that encompasses, for example, therapeutic, social or vocational horticulture. In this report, green care is used in this broader sense, i.e. including gardening activities.

User groups

User groups were defined as groups of people from the neighbourhood who might be interested in using the land at Bredtvet and Gaustad. At a preparatory meeting with Statsbygg and FMOA-LA, it was agreed that target groups would be mainly institutions adjacent to the areas, especially the women's prison at Bredtvet and Vinderen Psychiatric hospital at Gaustad. Six adjacent institutions were contacted, of which two at Bredtvet participated and four at Gaustad.

Subsequently, a spatial approach was used to define new user groups with potential interest in UA. For schools and elderly peoples' homes, a radius of c.1.5 km from Bredtvet land and Gaustad land was set as a limit from Oslo Municipality when searching in the public map resources. A total of 12 new user groups and stakeholders were contacted around Bredtvet area, of which 4 participated in the study. In Gaustad, out of 14 external users and stakeholders who were contacted, 8 participated in the study.

In addition, informal conversations were held with two residents who use the Bredtvet area.

RESULTS AND SITE-SPECIFIC RECOMMENDATIONS

Bredtvet

Soil resources

A total of 10.6 ha were mapped at Bredtvet (see map in Appendix 1). In total, 53% of the area is rather flat, with a slope less than 7%; almost 35% has a slope between 7% and 20%; and 12% has a slope steeper than 20%. We restricted soil mapping to rather open areas (i.e. without many trees).

The soils at Bredtvet consist of marine clays. Because of the high clay content, the natural drainage of the soils is poor. In order to be farmed, most of this area would need to be artificially drained. In the south-eastern part, a small area has minor, coarse-textured disturbances in the topsoil, probably due to building activities.

Four different WRB units were distinguished at Bredtvet (Fig. 7). Almost 87% of the mapped area consists of Retic Stagnosol (Siltic) (STrt-sl). In Norway, this is a very common agricultural soil type with marine clay deposits. Because of the high silt and clay content, precipitation moves slowly through the soil profile. In flat areas these soils are subject to waterlogging after periods of heavy rainfall.

A small, steep area (slope between 20% and 33%) consists of Cambic Luvisol (Siltic) (LVcm-sl). This soil has a similarly high silt and clay content, but is moderately well drained, partly because of the steepness of the terrain. Gleysol and Luvisol respectively cover c.2% and c.3% of the total area.

Another small, almost flat and rather low lying area consists of Eutric Gleysol (Clayic) (GLEu-ce). This soil has a high clay content, is poorly drained, and is characterized by a groundwater level.

Immediately north of the prison there is an area of Stagnic Spolic Technosol (Clayic) (TCsp-st-ce). This soil is poorly drained, and the topsoil has a high clay content. It seems probable that subsoil clay has been deposited there. Some spots with gravel and coarser fragments were found in this area, which covers c.6% of the total area.

Bredtvet - Suitability for urban agriculture

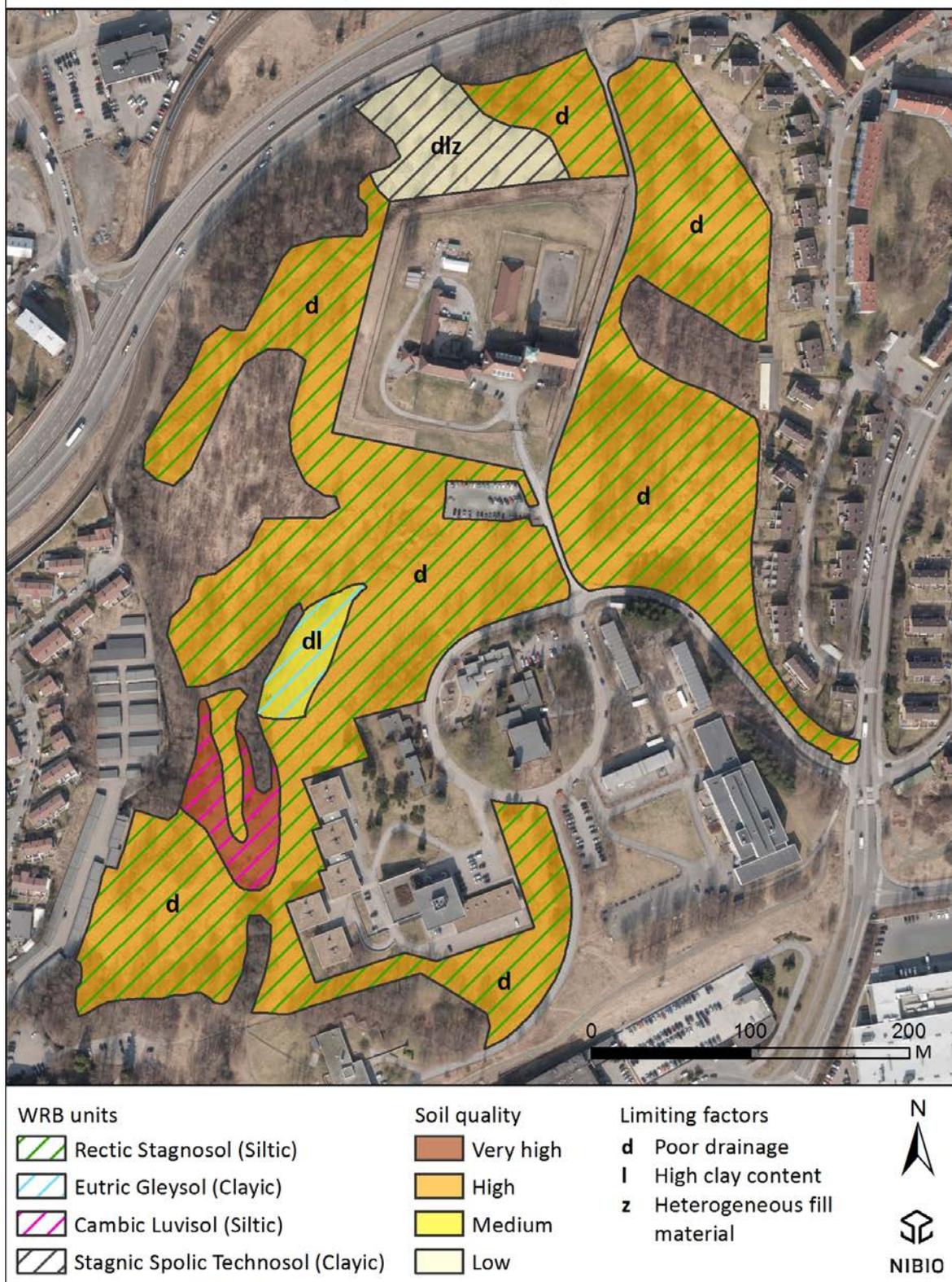


Figure 7: Soil resources at Bredtvet.

In the Bredtvet area most of the land has high-quality soils. The whole area has silty clay loam topsoil (except for the Technosol, where there is coarse, gravelly sand), which is rather good for agriculture purposes.

The general limiting factor is poor drainage, due to the high clay content and high groundwater level (Eutric Gleysol) or to slow rainwater percolation (Rectic Stagnosol). In those areas, it would be recommendable to develop a drainage system for better use of the soil resources. The Eutric Gleysol area has more challenges, namely a small creek flowing through it and a very high water content (Fig. 8).

In the south-west there is an area with high-quality soil (Cambic Luvisol). This soil type has a well-structured B-horizon and it is very suitable for agriculture purpose. It also has a high silt and clay content. In the north there is a Stagnic Spolic Technosol. As mentioned above, due to the coarse material in the area, the soil quality is rather low and a more detailed survey of the area would be required to determine which places would be best suited for UA.



Figure 8: (top left to bottom right) Groundwater level in the top layer; high clay content in the top layer; good, crumbly soil texture; very high-quality soil; and clay in the B horizon (Photos: Cristina Gil Ruiz / NIBIO).

Current land uses

Five different land uses were identified (Fig. 9): (1) leisure area, (2) green corridor, (3) historical site, (4) educational area, and (5) spontaneous food garden.

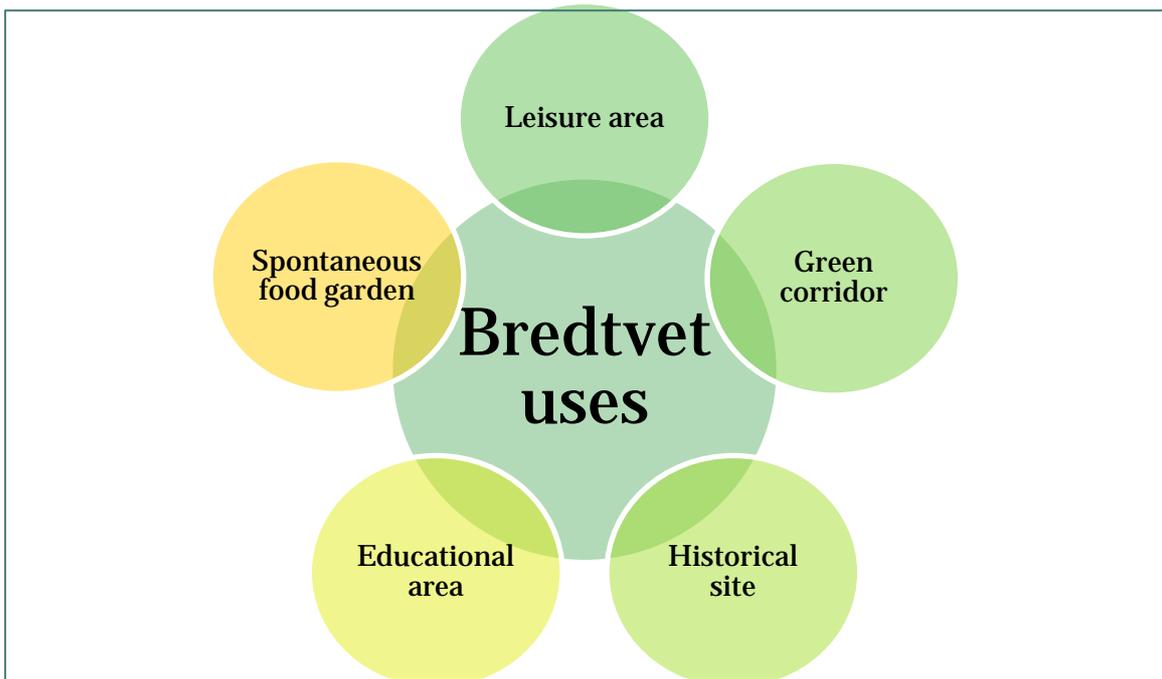


Figure 9: Current uses of Bredtvet land.

Residents use the Bredtvet area as a leisure space. They jog, enjoy nature, go for walks, ride horses, and walk with dogs (Fig. 10). It is an area with relatively many trees and much wildlife. People have built improvised benches in strategic places with attractive views.



Figure 10: (top left to bottom right) Horse tracks on a path, improvised bench, community space, and agility training camp (Photos: Cristina Gil Ruiz / NIBIO).

The area between Bredtvet prison and Bredtvet kindergarten is used as a social meeting place for, for example, barbeques in the summer and agility exercises with dogs. Statped's lawn is used as football field and the sloping area is used for skiing or sliding down in the winter.

A rather small area along the river in the east is formally protected as a green area (Bjerke Bydel 2014), even though most of Bredtvet land appears to function as a green corridor. There are many trees and plants that attract birds, insects, small mammals, and deer (Fig. 11). A kindergarten representative said:

We [children and teachers] have been watching deer. They are living in the fields. We were outside and looking for their signs, their sleeping place. We found animal faeces.



Fig. 11: Forest in the eastern part of Bredtvet area (Photo: Cristina Gil Ruiz / NIBIO).

Bjerke District is currently developing a 'Bjerke Circle': footpaths with signs through Bredtvet, which connect the neighbourhood to Marka (Ragnhild Olaussen, pers. comm. 2015).

Another type of land use in Bredtvet is the historical landscape with symbolic buildings (Fig. 12). The prison building has a long history. It was built in 1918 as a youth school and enlarged in the following decades. With the invasion of the Nazis, the building was transformed into a political prison in 1941. After World War II, it was converted into a women's prison. This historical site is important for Oslo's history and gives an identity to Bjerke. Another building of historical interest is Statped's office, which is owned by Statsbygg and received an architectural award.



Figure 12: Bredtvet women' prison, a historical site (left) and Statped's award-winning building (Photos: Cristina Gil Ruiz / NIBIO).

Bredtvet also provides educational opportunities. Children visit the land in order to learn about the different seasons and related changes in nature. They collect leaves in the autumn and flowers in the summer. They also learn about wild animals and other life forms in nature:

We are looking at the changes in nature from summer to autumn, to winter, to spring (...) We go and build small cottages. (Kindergarten representative)

The last type of land use found at Bredtvet is a spontaneous food garden, which has developed due to the berry bushes growing in the area. Raspberry bushes grow along the main path in the eastern part of the area. Children from the local school and residents collect the berries in summer (Fig. 13)



Figure 13: Raspberry bushes along path (Photo: Cristina Gil Ruiz / NIBIO).

Users' and stakeholders' desires and perceived challenges

Several desires and visions for the future development of the Bredtvet area emerged from the documents provided by user groups and the spaces envisioned during the formal and informal interviews. The data were grouped into two major categories: (1) 'intangible desires', meaning ideal aspects of the land, and (2) 'tangible desires' or materially concrete wishes and desires. Intangible desires can be subdivided into two subgroups: protection and governance (Fig. 14).

Bredtvet site protection encompasses the idea that residents, policymakers and stakeholders want to protect Bredtvet as a green corridor and a historical site. The Bredtvet area is highly valued by the people who use it, and securing the land for protecting green and cultural areas is a priority for Bjerke Bydel:

Unsecured remaining green spaces and cultural landscapes that have a particular value for the residential environment, biodiversity and cultural heritage shall be systematically protected.
(Bjerke Bydel 2014; translated)

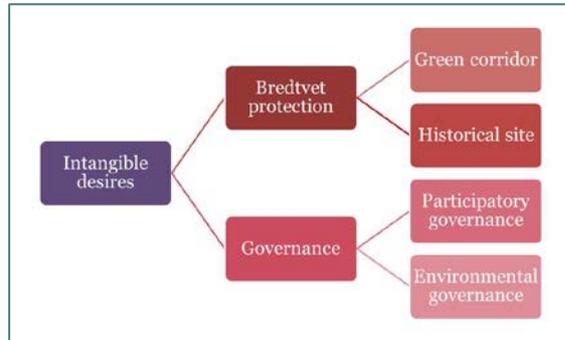


Figure 14: User groups' and stakeholders' intangible dreams for Bredtvet.

Thus, ensuring Bredtvet's future as a green corridor and a historical site is a main demand of Bredtvet residents and of the local authorities. A major issue is the avoidance of the construction of a road connecting Trondheimsveien and Østre Aker road. Bjerke District authorities have proposed alternative locations in order to avoid the road being built on Bredtvet land (Bjerke Bydel 2014).

The governance idea refers to the users' willingness to participate actively in development planning. One user group representative said:

I can tell from the work we have done in this area; if Statsbygg would open up for opportunities to speak with the citizens in this area to find out what to do with this area around the prison, they would find a lot of inhabitants who are interested in taking part in the development and come with their ideas and desires for the place. (Veitvet Frivilligsentral representative)

The same interviewee mentioned that many workshops had been held and social research conducted when the Groruddalssatsingen programme was developed in 2012. The neighbours' interest in becoming active agents in the design of Bredtvet became evident, but the main focus at that time was on Veitvet. However, people had Bredtvet in mind:

It was something that people said. They would like [Bredtvet] to be a recreation area for the neighbourhood. (Veitvet Frivilligsentral representative)

Tangible desires for Bredtvet included urban agriculture and park infrastructure (Fig. 15).

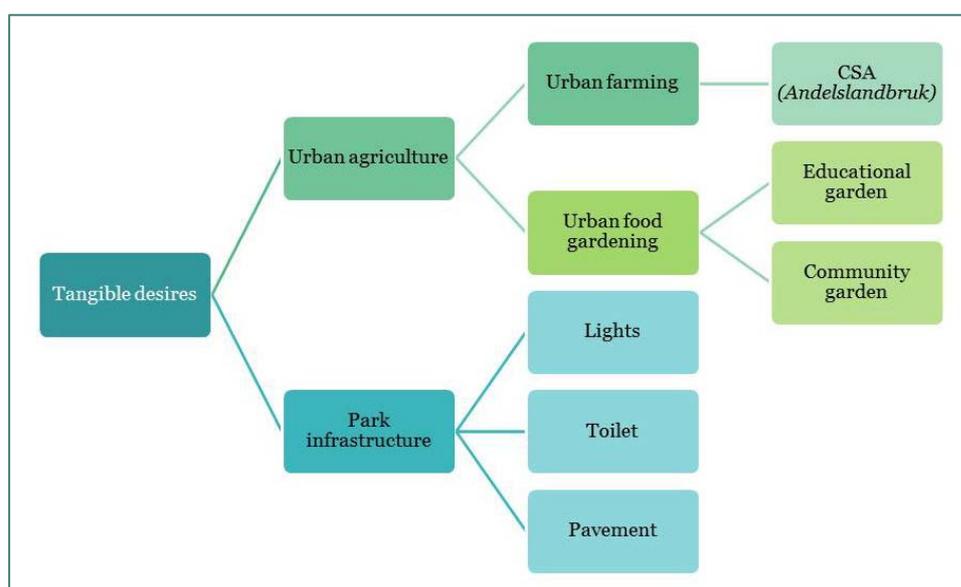


Figure 15: User groups', neighbours' and stakeholders' tangible desires for Bredtvet.

Analysis of the data showed that users wanted Bredtvet's northern and north-eastern part to become a green park, with lights, paved paths and toilets. These ideas concur with the footpaths connecting Bjerke and Marka, which have been planned by Bjerke District authorities. The footpaths would also enhance the connection between the two areas at Bjerke that are separated by Trondheimsveien highway (Ragnhild Olaussen, pers. comm. 2015).

Urban agriculture encompasses different ideas. Users and stakeholders have envisioned both urban farming and urban food gardening. A UA specialist mentioned the feasibility of the Bredtvet area being used for urban farming, as follows:

A CSA² project would provide locally grown, high-quality vegetables to the neighbours and could be taken as a pilot project in Oslo. Moreover, such a project could be promoted by local entrepreneurs. (Key stakeholder)

Users also envisioned urban food gardening. User groups are potentially interested in educational gardens or community gardens:

(...) something that we can do together with the kids. We can water, plant, remove weeds, take care of the garden (...) pick some vegetables and eat them in the kindergarten. (Kindergarten representative)

An interviewee from Statped mentioned that it would be possible to have community gardens with flowers and vegetables on Statped's lawn. Since children from a nearby kindergarten use the area for playing football, educational gardening could be integrated into their activities. In 2017, Statped will abandon their current building and move to new facilities elsewhere. Nevertheless, activities could continue if the landowner and new tenant are agreeable.

The Statped building has a very interesting roof structure that might support a roof garden. This possibility would have to be further analysed by specialists in green roofs.

When users and stakeholders were asked about the challenges of participating in a UA project, they mentioned the impossibility of taking responsibility for a UA project by themselves and the lack of money:

The problem for us is whether we are going to have the main responsibility. We could support the project with work, but we don't have the money. (Kindergarten representative)

The same representative mentioned their willingness to take part in a gardening project as long as the project is managed by someone else. Schools in Bredtvet that did not have gardening activities did not participate in the study. The lack of such activities may have been due to the notion that school gardens are challenging if no teachers with the necessary knowledge and passion are present. Indeed, the Oslo school gardens' coordinator stressed that one challenge of school gardens is that teachers do not have the relevant knowledge to do the work. He considered that the most efficient way to develop successful school gardens would be to have professionals who would show, teach and facilitate the work.

Another perceived challenge was linked to one kindergarten representative's memory of a rat problem in their former kindergarten garden:

We used to grow different kind of vegetables, and then we discovered a lot of holes in the ground, and a huge rat problem emerged, so we needed to contact a company working with pests and we sowed grass instead.

² Community supported agriculture (*andelslandbruk*).

Ideas, inspirations and recommendations

The Bredtvet area has high-quality soil resources on which different UA projects could be developed (Fig. 16).

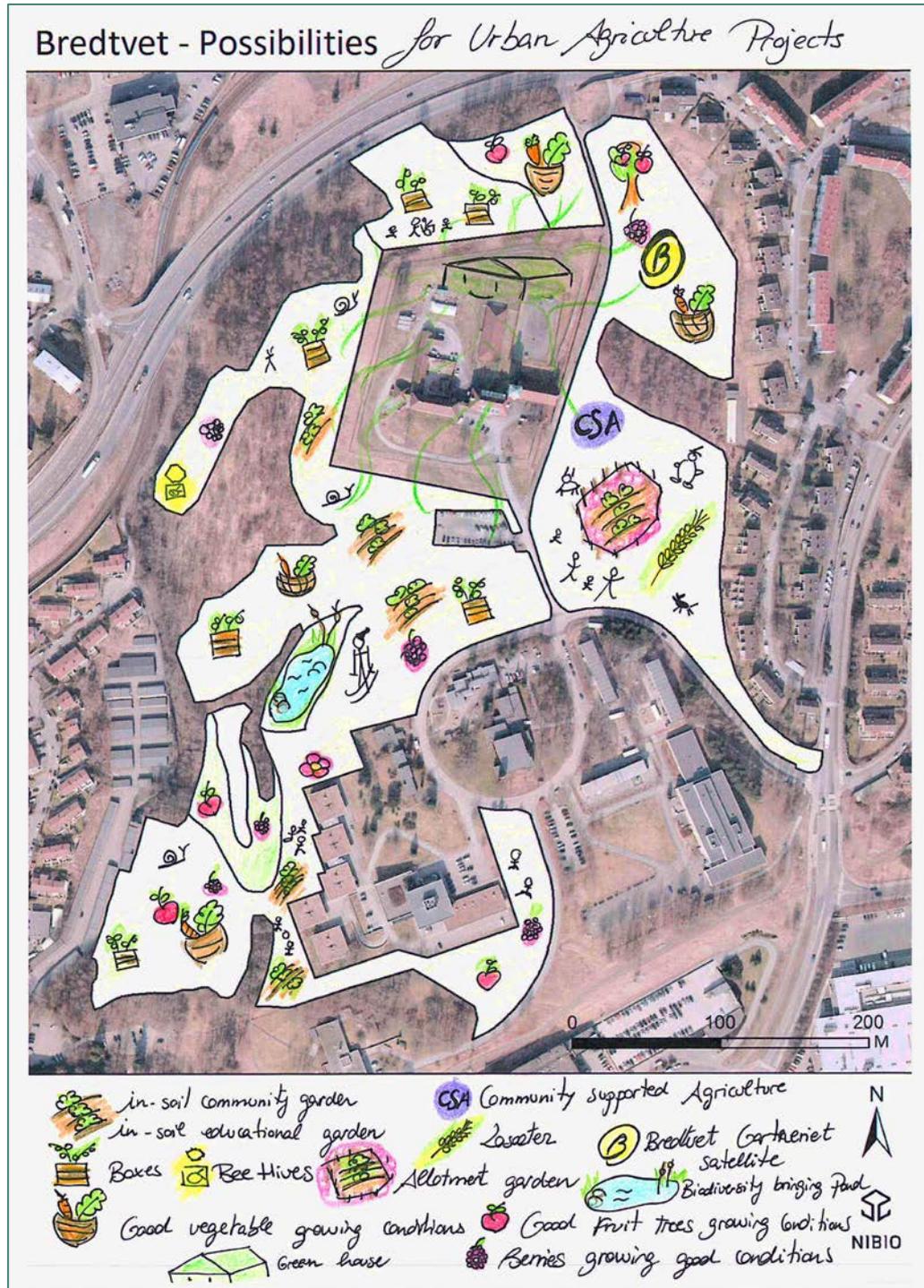


Figure 16: Sketch of potential UA projects at Bredtvet.

All soil types, with the exception of Technosol, are suitable for growing berries, fruit trees and vegetables (Brussels sprouts, cabbage, cauliflower, broccoli, carrot, beans, celery, lettuce, beets, red better, corn and leeks)³.

Western Bredtvet is a vast area where both urban farming and urban food gardening could be developed. Although the soil quality is high, drainage would be required. As explained above, CSA could be suitable for the area. The land could also be used for allotment gardens or joining existing initiatives in Oslo, such as producing cereals for the Losæter project,⁴ if neighbours and Losæter project leaders were interested.

Urban food gardening such as community or educational gardens seems suitable for the green corridor area (east Bredtvet). One key stakeholder suggested the idea of linking Bredtvet with the emerging competence centre project at Bygdø Kongsgård called Gartneriet⁵. The vision was for a thematic park (e.g. using the existing berry resources) that would be autonomous but at the same time connected to Gartneriet (a “satellite”).

Regardless, a specific plan for developing UA activities within the green corridor would be highly recommendable. As stated by the school gardens’ coordinator for Oslo:

Natural places must be used in order to conserve them, and ‘to conserve’ means to use the space following ecological and traditional principles.
(Tore Faller, pers. comm. 2015)

This is especially relevant at Bredtvet, since Bjerke Bydel wants it to be a protected area. UA activities would not conflict with neighbours’ wishes of having a park in the area. UA could even create a more interesting space to walk in and explore.

The area around Statped could offer possibilities for community and educational gardens. However, it might be more interesting to develop educational gardens since children from nearby kindergartens already use the land.

Also the central part of the Bredtvet area could host community and educational gardens. At the lowest part of the terrain, where the groundwater level is high, a pond surrounded by an edible garden could be an interesting project to develop due the specific terrain conditions.

Table 2 shows benefits and challenges that potential UA projects in Bredtvet may have.

³ List developed by Siri Svendgård-Stokke based on NIBIO’s models for commercial farming. For non-commercial food gardening more varieties could be planted.

⁴ Losæter is a joint project of Herligheten gardens and the Flat Bread Society. It is developing a permanent demonstration farm in Oslo, which will grow cereals for the bakery at Bjørvika (<http://www.loseter.no>; <http://www.flatbreadsociety.net>; <http://www.bjorvikautvikling.no/kunst>; <http://slowspace.no>).

⁵ Gartneriet (<http://www.norskfolkemuseum.no/no/tilknyttede-enheter/Bygdo-Kongsgard/Adkomst/>)

Table 2: UA project's benefits and challenges at Bredtvet.

UA projects	Benefits	Challenges
Community supported agriculture (CSA)	<ul style="list-style-type: none"> - Local organic food production - Community building capacity - Local entrepreneurship - Leading example in Oslo 	<ul style="list-style-type: none"> - Private use of public land may be a challenge - Fences?
Educational garden		
<i>Kindergarten and school gardens</i>	<ul style="list-style-type: none"> - Kindergartens and schools without garden in the area - Green corridor friendly - Use of high-quality soil in south - Users willing to participate 	<ul style="list-style-type: none"> - Funding and project leader needed
<i>Losæter grain cultivation</i>	<ul style="list-style-type: none"> - Connection with existing projects in Oslo 	<ul style="list-style-type: none"> - No data about potential interest of Losæter leader
<i>Learning centre satellite (Gartneriet)</i>	<ul style="list-style-type: none"> - Connection with existing project(s) in Oslo 	<ul style="list-style-type: none"> - Funding and project leader needed
Community garden		
<i>Soil cultivation</i>	<ul style="list-style-type: none"> - Community building capacity - Green corridor friendly - Use of high-quality soil in south - Users willing to participate 	<ul style="list-style-type: none"> - Funding and project leader needed
<i>Box growing</i>	<ul style="list-style-type: none"> - Well suitable for the Technosol area 	<ul style="list-style-type: none"> - Funding and project leader needed
Allotment garden	<ul style="list-style-type: none"> - Experience from Årvoll Gård 	<ul style="list-style-type: none"> - Research about the need is required since neighbour allotments have space. - Funding and project leader needed - Fences?

An exemplary UA project, 'Trygg i Naturen' (Safe in nature), in Grorud Bydel has been led by Romsås Frivillighetssentral: vegetables grown in boxes as a way to involve people in collective outdoor activities (Fig. 17).



Figure 17: (left to right) Vegetable grown in boxes; harvested produce; and project leader watering vegetables (Photos: Benthe Lill Krigerød).

Grorud Bydel has provided financial support and a UA specialist was hired to prepare the boxes. One of the project leaders stated:

Oslo kommune needs to provide money for funding this. You can't raise money just by selling waffles. (Frivillighetssentral representative)

She asked a neighbour for permission to place the boxes on his private land since it was very difficult to place them on public land:

The challenge is the bureaucracy. Bureaucracy stops projects. People with interest 'burn out'. This project worked because it was just a phone call. (Frivillighetssentral leader)

The project is exemplary because it has been successful in involving neighbours of different nationalities in activities in which they would not normally participate.

A main interest that evolved at the preparatory meeting with representatives from Statsbygg and FMOA-LA was to study the possibility of engaging Bredtvet women's prison in UA.

Unfortunately, I was not allowed to interact with the prison authorities, and therefore had to look for examples of other prisons with farming programmes as a source of inspiration. Bastøy prison in Norway and Capanne prison in Italy are inspirational examples.

Bastøy prison includes an organic farm using pre-industrial practices such as work horses. However, for Bredtvet it might be of particular interest to learn from their greenhouse experience. Bastøy has two greenhouses in which the prisoners grow vegetables and flowers, which are later planted in the 1 ha kitchen garden or in flowerbeds. The vegetables are either used in their own kitchen or are sold.

In Italy, Capanne prison has created a social enterprise where vegetables are grown and free-range chickens are kept and bred, and which is used as a training site in organic farming. Moreover, the activities at Capanne prison have had multiple benefits, including the personal well-being of the inmates, high-quality food and economic benefits. The prison's governor mentioned that the social gap between prisoners and neighbours had decreased significantly. The prisoners sell products at the farmers' market, and this helps to improve their social image and promotes social insertion.

It could be desirable for Bredtvet prison to embrace the greenhouse idea and start to provide flowers and vegetables for community gardens in the area, as part of an UA-related social integration programme for the inmates.

Finally, all stakeholders underlined that any public project needs a project leader in order to make the project function:

To run projects based on volunteer work is not possible for people with other job positions. Developing a project is very demanding and brings many positive aspects to the community. (UA stakeholder and former allotment project leader in Groruddalen valley)

The introduction of a UA coordinator at Bjerke Bydel seems recommendable, since the district has both existing projects such as Årvoll Gård and emerging possibilities. Initially, the UA coordinator could study and systematize concrete UA desires among the areas' neighbours.

The land is under different types of pressure (as described in the preceding section), and it seems that both neighbours and local policymakers are willing to protect it. Materializing UA projects could be a first step towards systematic protection as a green area. A bottom-up approach seems very appropriate, given the interests of the community.

Gaustad

Soil resources

A total of 2.1 ha were mapped at Gaustad (see map in Appendix 2). The natural geological deposit is marine clay, but almost 82% of the mapped area was disturbed with material originating from elsewhere. Thus, Gaustad has an uneven type of topsoil (Fig. 18).



Figure 18: Topsoil Rectic Stagnosol (left) and coarse fragments in Technosol (right) (Photos: Cristina Gil Ruiz / NIBIO).

Six different WRB units were found (Fig. 19). An area of c.0.1 ha in the south-western part of the area consists of Dystric Regosol (Himic, Siltic⁶). This soil is moderately well drained and has a relatively high content of humus down to a depth of 50 cm. This area has the best terrain for gardening.

In total, 18% of the investigated area consisted of Retic Stagnosol (Siltic), which is a very common soil type in Norway in general and is the most extensive type at Bredtvet in particular. This soil type is poorly drained due to its high clay content and it is characterized by slow percolation of rainwater.

Debris comprising bricks, gravel and other coarse fragments were found in the topsoil over the largest part of the Bredtvet area, the soil type is Stagnic Spolic Technosol. The soil on 47% of the

⁶ Himic means $\geq 1.72\%$ organic matter and Siltic means $\geq 50\%$ silt in upper 30 cm of an Ap horizon. Scleretic means $\geq 40\%$ of coarse material in upper 100 cm of soil, and Episcletic means $\geq 40\%$ in upper 50 mc.

total area mapped is of Skeletic character. All Technosol units are poorly drained, but differ from each other due to differing amounts of coarse fragments in the upper 50 cm of the soil. All of these soil types are rather low quality.

Gaustad - Suitability for urban agriculture

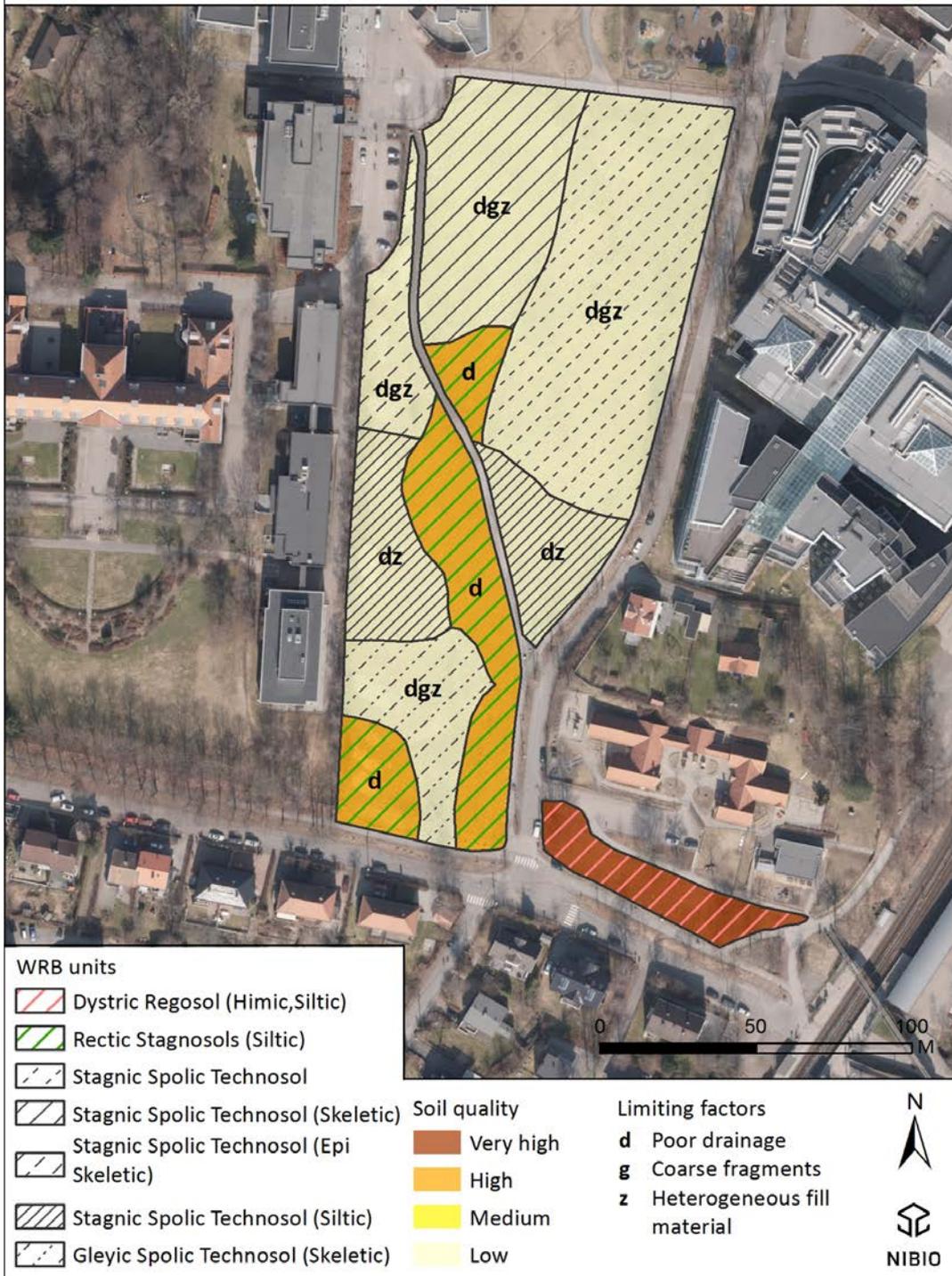


Figure 19: Soils at Gaustad.

Some stones in the northern and eastern parts of the area were identified as possibly alum shale (Fig. 20). Although this mineral is present in much cultivated land in Norway, high quantities of it can release cadmium into the soil, which potentially contaminates crops and could thus represent a health risk. If soil cultivation were to be developed in cultivated lands, soil analyses for heavy metals would be highly recommendable. Moreover, the Norwegian Environment Agency (Miljødirektoratet) has categorized areas adjacent to Gaustad as contaminated sites for 'restricted use' only (Fig. 21).



Figure 20: Possible alum shale found at Gaustad (Photo: Cristina Gil Ruiz / NIBIO).

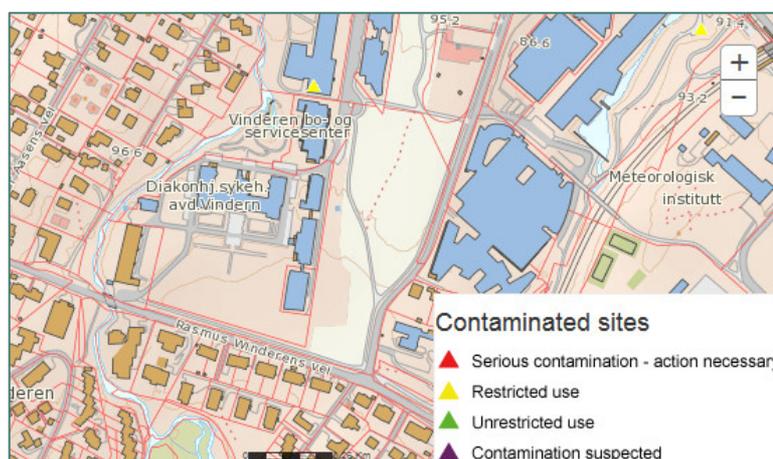


Figure 21: The Norwegian Environment Agency's soil pollution map of the areas adjacent to Gaustad (<http://www.environment.no/Topics/Hazardous-chemicals/Contaminated-soil/>).

Current land uses

Of the nine user groups participating in the social survey at Gaustad, only three actively used the area. Institutions immediately adjacent to the area use the land all year round, whereas institutions farther away (up to 1.5 km) do not visit the area at all. The data revealed four main land uses in the area (Fig. 22): leisure, education, history, and walking.

A leisure area is a common type of land use that provides opportunities for exercising, skiing and sliding, playground activities, and picking flowers (Fig. 22). Elderly people from a day care centre in Gaustad use the land on a daily basis as space for exercising, and walk around the area using the paved paths. Children from nearby kindergartens also visit the area for physical activities. In wintertime the kindergartens use the area for skiing and other outdoor activities.

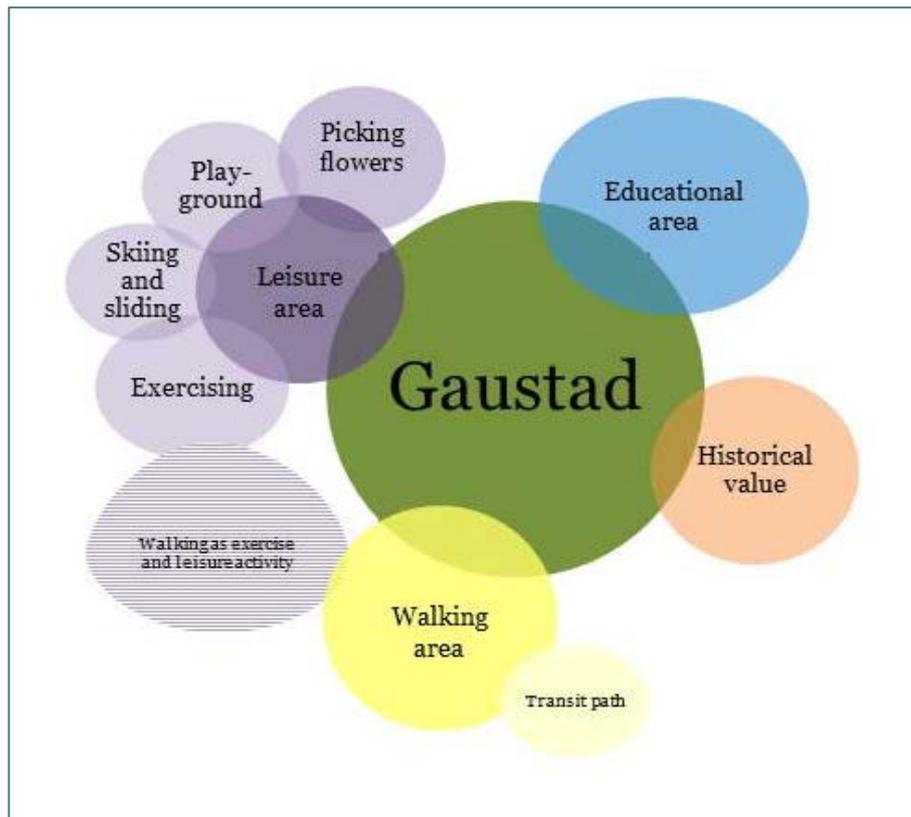


Figure 22: Current uses of Gaustad land.

Gaustad is used as a playground by kindergarten children. Another use is picking flowers. Both elderly people and children visit the land in summer to gather wild flowers and interact with ‘wild’ nature. The interviewees stressed that in summer the Gaustad area is a perfect space for picking flowers, enjoying the sun and exercising (Fig. 23):

It is a good area because it is fun to play there. It is more natural. There are nice flowers. They [the children] go to the field and play, using it for physical activities. They are very happy about having this area so close.

(Kindergarten representative)



Figure 23: Flowers and pollinator (left); elderly people exercising (centre); and a person walking with a dog (right) (Photos: Cristina Gil Ruiz /NIBIO).

The area is used also used for education, namely to observe and learn about nature:

They [the children] value having a free empty spot, a place where they can play and explore it as it is, with bees and wild nature. (Kindergarten representative)

The use of Gaustad as ‘walking area’ was directly observed.⁷ Gaustad land has four recognizable paths (Fig. 24). Only one is paved and there are two distinct parts: a transit path and leisure walking area. A transit path may indicate the most obvious use of the land because it is located between Blindern metro station and multiple public and private buildings. This characteristic has shaped Gaustad area as a transit space. However, the use of area as a place to walk with dogs was also observed.



Figure 24: (top left to bottom right) People coming from Blindern metro station crossing the land and examples of unpaved paths (Photo: Cristina Gil Ruiz / NIBIO).

One type of intangible use, categorized as ‘historical value’, was found. Gaustad area used to be farmland and for some people the area is considered a ‘historical site’. The interviewee from Vinderen nursing home paraphrased some comments that residents had expressed to her:

If they are building here, I will cry.

I hope this last field stays as a green area.

⁷ A ‘walking area’ is a category in its own right, as it differs from the exercising activities done by the elderly. The term ‘transit path’ was considered as too strong and too specific to be included within another category.

The grass was cut twice between June and October. A key stakeholder mentioned that the grass might be used as fodder. However, it was not possible to verify whether such a practice existed in Gaustad.

Users' and stakeholders' desires and perceived challenges

The data were grouped into two major categories: (1) 'intangible desires', which means ideal aspects of the land, and (2) 'tangible desires' or materially concrete wishes and desires.

Subcategories of intangible desires (Fig. 25) are social aspects and health and physical care. In terms of the social aspects, users find it very relevant to create spaces where intergenerational meetings and social relations are promoted. At the same time, it is important to make such areas accessible as far as possible while following the principles of universal design (*universell utforming*) so that users with different mobility characteristics can easily access social activities or resources on the land.

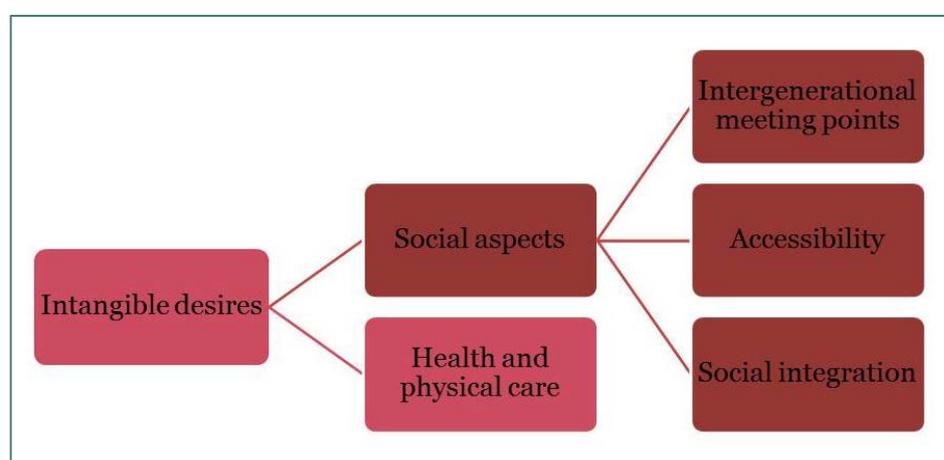


Figure 25: Users' intangible desires at Gaustad.

Moreover, the interviewed stakeholders suggested that social integration could be promoted through programmes for unemployed people, refugees or people at risk of social exclusion in particular. The idea of creating social enterprises with the same purpose was also mentioned.

In addition, health and physical aspects were of key importance for the user groups, for whom having a space that provides possibilities for walking and other exercising was very relevant.

The tangible desires (Fig. 26) related to two subcategories: infrastructure and urban agriculture. Infrastructure encompasses all ideas aiming for facilities that improve the quality of the area. Basic infrastructure encompasses benches, pavements, and toilets. The interviewee from Bybi personally envisaged a pollinator corridor (*pollinatorpassasje*) and the entire area as an educational space with information about bees and biodiversity. The idea of incorporating outdoor barbeque facilities together with a shelter (*lysthus*) emphasizes the desire for socialization opportunities all year around.

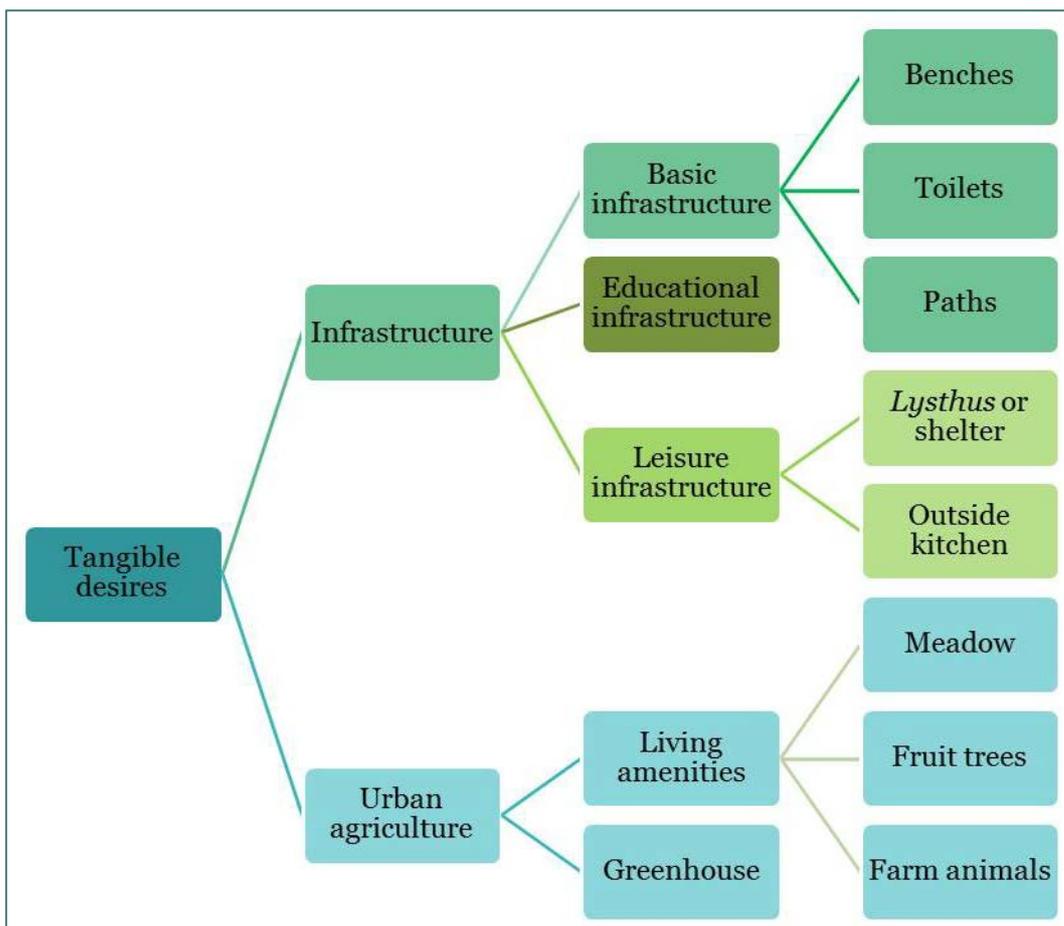


Figure 26: Users' tangible desires at Gaustad.

Urban agriculture can include both living amenities and a greenhouse. Living amenities include all plants and animals that users imagined in the area: a berry bushes labyrinth, wild flowers, trees, and small farm animals. Interviewees imagined a space where people could interact with nature and find food in a similar way to people who collect mushrooms when walking in the forests. Users described an ideal for the area as a place *'where to pick flowers, berries and fruits here and there, without excessive management'* (kindergarten representative). Another school representative suggested that each school could plant a tree on the land, and to observe seasonal cycles in nature.

Users were not especially interested in having a typical food garden. They perceived food gardens as an activity that requires too much engagement, work and time. However, they seemed more positive about participating in a collective garden without taking the main responsibility. Moreover, the interviewees dreamt about a space where nature is present – a space that would allow people to observe cycles in nature and stimulate all the senses. A psychologist with special focus on green care mentioned the idea of having a greenhouse for year-round green care services and as an arena for research conducted by adjacent psychological institutions.

When asked about their resources and perceived challenges to materializing their desires, they mainly answered that they were lack of both money and time:

(...) to develop the project it is necessary to free teachers, and usually when taking care of the children it is not possible to do more if you are outside in a unfenced space (...) It is possible to finance the creation of a small thing in the kindergarten, but a bigger project would require funding.
(Kindergarten representative)

Ideas, inspirations and recommendations

What ideas and recommendations may be feasible for Gaustad land? Some tangible desires are more feasible than others if soil types, current land uses, and opportunities and challenges are taken into account (Table 3).

Interestingly, there were not any desires that would exclude any currently existing land use. For example, if soil analysis revealed that there would not be any pollution risk, existing land use and UA could definitely coexist in the area.

Initially, all projects need a project leader in order to function. Moreover, it is necessary to explore the maintenance and the financial aspects. The interviewees did not think that their institutions would have the financial means to develop them. For many users, public agencies are the responsible actors for developing the area. Experiences from Geitmyra⁸ show that also private entities could finance social projects (e.g. an outdoor kitchen was funded by a private entity).

If soil analyses show that there would not be any pollution risk in the areas where alum shale was found, the Gaustad area could combine the ideas of being a pollinator corridor (prairie) and an edible garden. The prairie for pollinators would allow continuation of current land use (e.g. picking flowers and skiing) and an edible garden would fit well with users' desires because it would mimic nature and not need extensive management.

In Malvik Municipality, to the east of Trondheim, a self-sustained edible garden has existed since the late 1980s⁹, with perennial edible plants, fruit trees, and berries, and following permaculture principles (Barstow 2014). In Ås (Akershus), the Baerekraft i Butikk food cooperative¹⁰ (BUA) is currently developing a fruit garden at the NMBU campus, which could serve as an example. Figure 27 shows how projects could be spatially arranged at Gaustad.

If soils are polluted, boxes and a greenhouse could be good options. A greenhouse would allow research on green care and thereby provide valuable information about the impacts of horticulture on mental health and social integration. Beyond the participants in this study, the Department of Psychology (PSI) at the University of Oslo could be considered as a potential collaborating partner.

⁸ Geitmyra is a c.100 year old school garden area which currently hosts 17 school gardens and demonstration fields. A part of the area has become an allotment garden with 130 individual parcels.

⁹ <http://www.edimentals.com/blog/>

¹⁰ <http://www.buabutikk.no/>

Table 3: UA projects' benefits and challenges at Bredtvet.

UA projects	Benefits	Challenges
Community garden		
<i>Soil cultivation</i>	<ul style="list-style-type: none"> - Use of high-quality soil in south - Users willing to participate - Intergenerational meeting point - Abels hage in John Colletts plass could serve as model 	<ul style="list-style-type: none"> - Rather many trees in the area with the best soil quality - Funding and project leader needed
<i>Box growing</i>	<ul style="list-style-type: none"> - Perfect for installing even on polluted soil - Elevated boxes possible for people in wheelchairs (universal design) - Experience from Grønland can serve as inspiration 	<ul style="list-style-type: none"> - Funding and project leader needed
<i>Edible garden</i>	<ul style="list-style-type: none"> - Meet users' desires - Low maintenance requirements - Examples elsewhere in Norway 	<ul style="list-style-type: none"> - Funding and project leader needed
Educational garden		
<i>Pollinator passage</i>	<ul style="list-style-type: none"> - Compatible with current land use - Promotes biodiversity and pollinators - Connected with strategic plan for Oslo 	<ul style="list-style-type: none"> - Potential health and animal risk if soil is polluted - Funding and project leader needed
<i>Kindergarten and school gardens</i>	<ul style="list-style-type: none"> - Kindergartens and schools without garden in the area - Use of high-quality soil in south 	<ul style="list-style-type: none"> - Funding and project leader needed
<i>Livestock gardening</i>	<ul style="list-style-type: none"> - Brings husbandry back to the city - Is very pedagogic in a time when mental distances between farm animals and urban dwellers are large 	<ul style="list-style-type: none"> - Animals need intensive and appropriate care - Need to fence the area - Area may be too small for certain animals - Funding and project leader (farmer?) needed
Therapeutical garden <i>Greenhouse</i>	<ul style="list-style-type: none"> - Year-round activities possible - Very adequate for surrounding mental health institutions - Possible arena for green care research - Could provide plants to nearby school and community gardens 	<ul style="list-style-type: none"> - Not self-sustained, requires long-term engagement - Interest from partner institutions required - Funding and project leader needed

Interestingly, a representative of Vinderen psychiatric hospital pointed out that in order to integrate green care in a therapeutic way more research would be needed. Actually Gaustad may have a potential for both green care services and research because many nearby institutions are related with health and social services. Thus, it could be a great opportunity to realize such a project at Gaustad.

Farm animals do not seem very likely to be reintroduced to Gaustad. Free-range hens might be a possibility in the southern part of the area with high-quality soil. However, they need attention

every day and their well-being may be compromised without proper commitment. A more plausible idea might be for schools in the neighbourhood to plant fruit trees at Gaustad, so pupils can both observe seasonal changes and harvest fruit from the orchard.

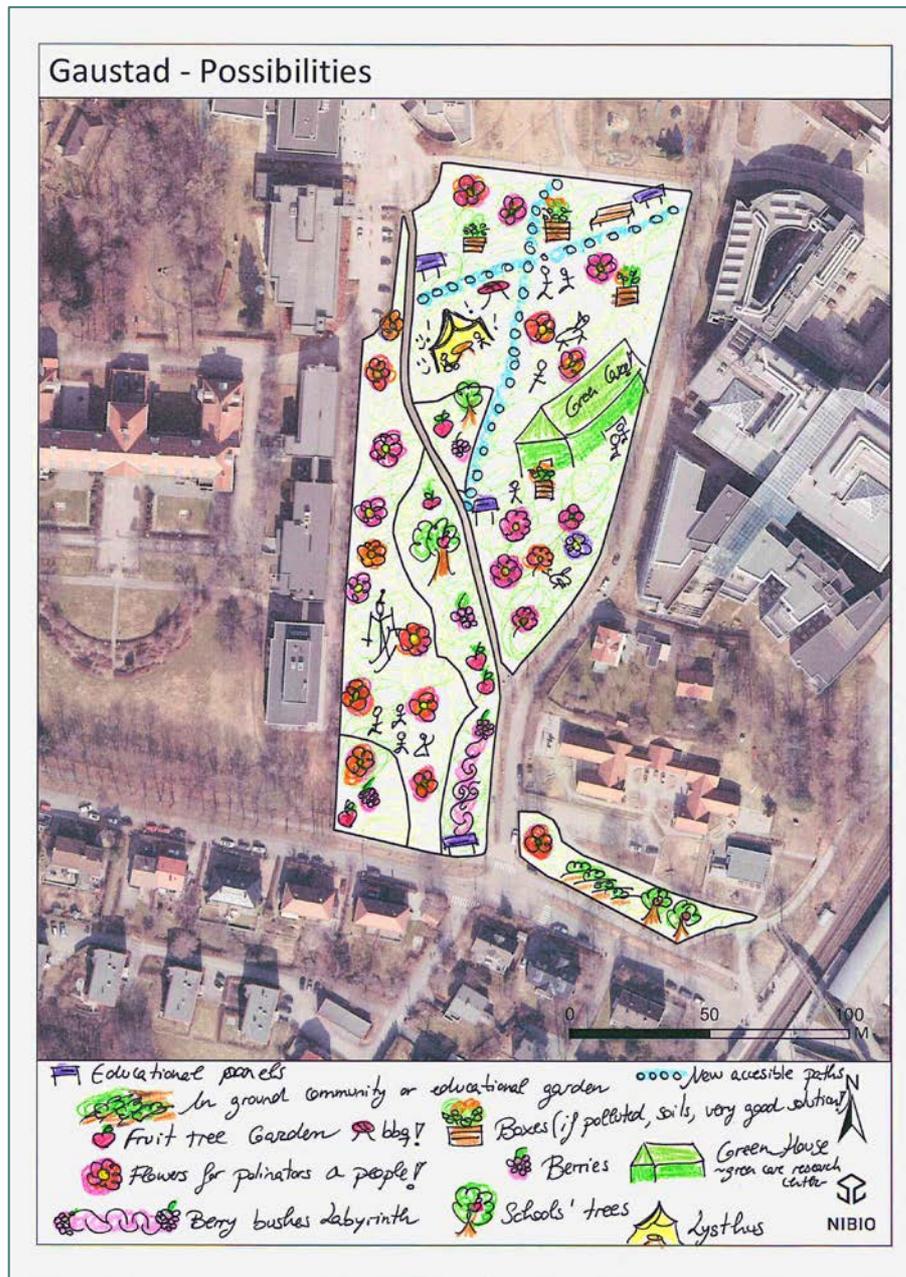


Figure 27: The possibilities for UA projects at Gaustad.

In Oslo, there is at least one example of a greenhouse at a health institution. A psychiatric nurse and an occupational therapist started an edible garden at Diakonhjemmet Psychogeriatric

Unit¹¹, which has cabbage, beans and aromatic herbs in pots, boxes and the flowerbeds, pear trees in the garden, and a greenhouse (Fig. 28).



Figure 28: Outdoor boxes with vegetables in the garden, the greenhouse, and tomato plants in the greenhouse at Diakonhjemmet Psychogeriatric Unit (Photos: Cristina Gil Ruiz / NIBIO).

The Diakonhjemmet Psychogeriatric Unit case is considered exemplary because the small greenhouse offers a unique environment to the residents. Patients who prefer calm environments find a quiet and beautiful space surrounded by plants. Moreover, both patients and employees can harvest home-grown organic food.

In summary, Gaustad could embrace educational, therapeutic and community gardens while simultaneously maintaining current land uses. It thus appears that desired infrastructure (basic, leisure and educational) and UA desires could coexist with current land use.

¹¹ http://diakonhjemmetsykehus.no/#!/diakon/forside/nyheter/_3182

INTERNATIONAL EXAMPLES AND OVERALL RECOMMENDATIONS

Funding for UA projects in Oslo is apparently a rather big issue. The interviewees commented that this hinders the development of UA projects that might be highly beneficial for local communities. Bureaucracy might also obstruct the development of UA.

Some cities are developing concrete strategies for the promotion of UA. One of the key stakeholders mentioned that in Oslo there seems to be a common idea that UA projects should be based on volunteer work. She found this idea problematic because *'in reality UA is a very important aspect of sustainable cities, it is not just nice ornaments, but a key strategy for the future'*. In addition, she said:

Historically, decision-makers have paid attention to concepts such as climate neutral cities, energy efficiency, public transport ... but common meeting points and green spaces are of vital importance, and UA can merge both ends. (Helene Gallis, pers. comm. 2015)

She further argued that at municipal level, Copenhagen could be a good example from which to learn:

They have a fund for social entrepreneurship. Districts receive funding for creating projects. It is a long-term political strategy to 'create' citizens who are engaged in their neighbourhood and in the city. (Helene Gallis, pers. comm. 2015)

It thus seems that the municipality is encouraging inhabitants to take actively part in UA development. Other international examples of municipalities actively engaging citizens in UA projects are Côte Saint-Luc (Canada), Vitoria-Gasteiz (Basque Country, Spain) and Malmö (Sweden). Côte de Saint-Luc began a UA initiative in 2013 following recognition that UA could be a key strategy for achieving community building capacity, health and wellness, food security, sustainability and local economic development.¹² The city authorities created the position of an urban agriculture coordinator, who manages, develops and implements various municipal UA projects, acts as link between local organizations and institutions, creates long-term strategic visions for the global initiative, and monitors and evaluates projects.

The case of Côte Saint-Luc seems exemplary because it shows the necessary determination at institutional level in order to promote UA in an active and practical way. It is also very relevant that UA is thought of as a development strategy – a transversal tool that serves various spheres in society such as health, education, well-being, community building, food production, nature conservation, and social integration.

¹²

<http://www.cotesaintluc.org/files/u1/cslgrown/CSL%20Grown%20An%20Urban%20Agriculture%20Initiative%202013-04.pdf>

Vitoria-Gasteiz was awarded the title of European Green Capital in 2012 by the European Commission. The municipality has developed UA since 1998. Initially, it developed an environmental research centre¹³ (CEA) that focuses on diverse environmental activities with a special focus on UA. The municipal authorities promote allotment gardens and teach users about organic agriculture, offer public courses for all ages, and have a close relation with school gardens. They hire professionals to teach about specific urban gardening activities and they promote UA in general. When the process started in 1998, the main intention was to manage illegal ('squatter') gardens and to improve the landscape. This has since been developed further, and currently the municipal authorities are developing an agrifood strategy for the city in which UA resources are central.

Vitoria-Gasteiz is considered exemplary because the municipality has developed an institutional body that focuses exclusively on improving the environmental aspect of the city through the promotion of UA and environmental awareness. A legal framework has been created at municipal level to promote and regulate UA, and currently the authorities are working towards the development of local agrifood systems. They are in direct dialogue with the citizens and therefore can improve their services and adapt to the new requirements.

Finally, the city of Malmö in Sweden provides guidance for cultivation initiatives and management on municipal land (Malmö Stad, 2014). It also reflects the broad potential of UA.

It is not just about food and culture when the concept of urban agriculture is discussed. It is equally about better ways to work with nature and better land use. It may eventually generate new and more jobs and enhance social sustainability. (Malmö Stad, 2014; translated).

The document mentions the municipal departments responsible for or involved in UA: Real Estate Department (*Fastighetskontoret*), Service Department (*Serviceförvaltningen*), Street Department (*Gatukontoret*) and Environmental Department (*Miljöförvaltningen*). It is potentially inspiring for Oslo to see how another Scandinavian city has developed a comprehensive program for developing UA in public spaces, engaging different sectoral departments. In the future we may see how even other departments such as the Health Department or Educational Department could integrate UA into their strategies.

In all of the exemplary cases, there is a political strategy committed to the development of UA. It seems that UA in Oslo is facing avoidable challenges. One solution might be to improve the institutional organization and reallocate more human and financial resources to UA. A key stakeholder mentioned: 'when the state understands the beneficial implications that UA has for the health, both physical and mental, it would be much easier to get funding'. This means UA policies must be promoted on local, regional and state level.

¹³ http://www.vitoria-gasteiz.org/we001/was/we001Action.do?aplicacion=wb021&tabla=contenido&idioma=en&uid=u3f0887ff_12e22f7d533__7fb1

CONCLUSIONS

Gaustad and Bredtvet are two green islands in a European capital that appear not to be used in their full potential. This is important to remark since green public spaces are much desired in many other cities, especially if they have high-quality soil resources, as it is the case for Bredtvet.

UA projects could most probably coexist with current land uses at Bredtvet and Gaustad. This is an important point, since many people believe that UA competes with other land uses even though UA projects are very adaptable to the conditions of the community, terrain and existing land use.

UA enriches cities in different ways and many decision-makers consider it a key strategy for city planning and thus prioritize it on local agendas. In Oslo, the development of UA seems to rely on the willingness of institutions to open up for more active collaboration with citizens and the firm allocation of resources. The results of the study show that it is perceived as difficult to obtain funding for UA projects in Oslo. This in turn promotes the instability of UA projects and a type of competence among UA initiatives that is not beneficial to the development of UA in Oslo, especially as the city is aiming to become a world leading sustainable city (City of Oslo 2013).

The perceived high level of bureaucracy might obstruct the development of UA. Overcoming institutional separation and having better dialogue among the public, institutional and private sectors would thus be of great importance. Such collaboration has the potential to create synergies that would promote UA as a transversal activity with the potential to benefit the environment, individuals, communities, and the local economy.

Finally, the following steps could be taken into consideration in future suitability assessment of UA sites:

(a) Considering the *area*, four aspects should be taken into account:

1. The state of the soil both physically and with regard to existing spatial plans or regulations.
2. Current land uses and future plans.
3. Desires and dreams of local communities.
4. Involvement of as many people as possible through participatory approaches (even in private projects).

(b) Considering the *project*, the following three aspects seem to be important:

1. Dialogue with people who have already created successful projects.
2. Dialogue with institutions (e.g. about concrete demands).
3. Encompassing different ideas under the same social and environmental desires; grass-roots movements sometimes have ideological differences that create boundaries between people working for the same goal.

Ideally, the above list of considerations might contribute to the development of a tool that systematically supports users with regard to creating UA projects on former farmland.

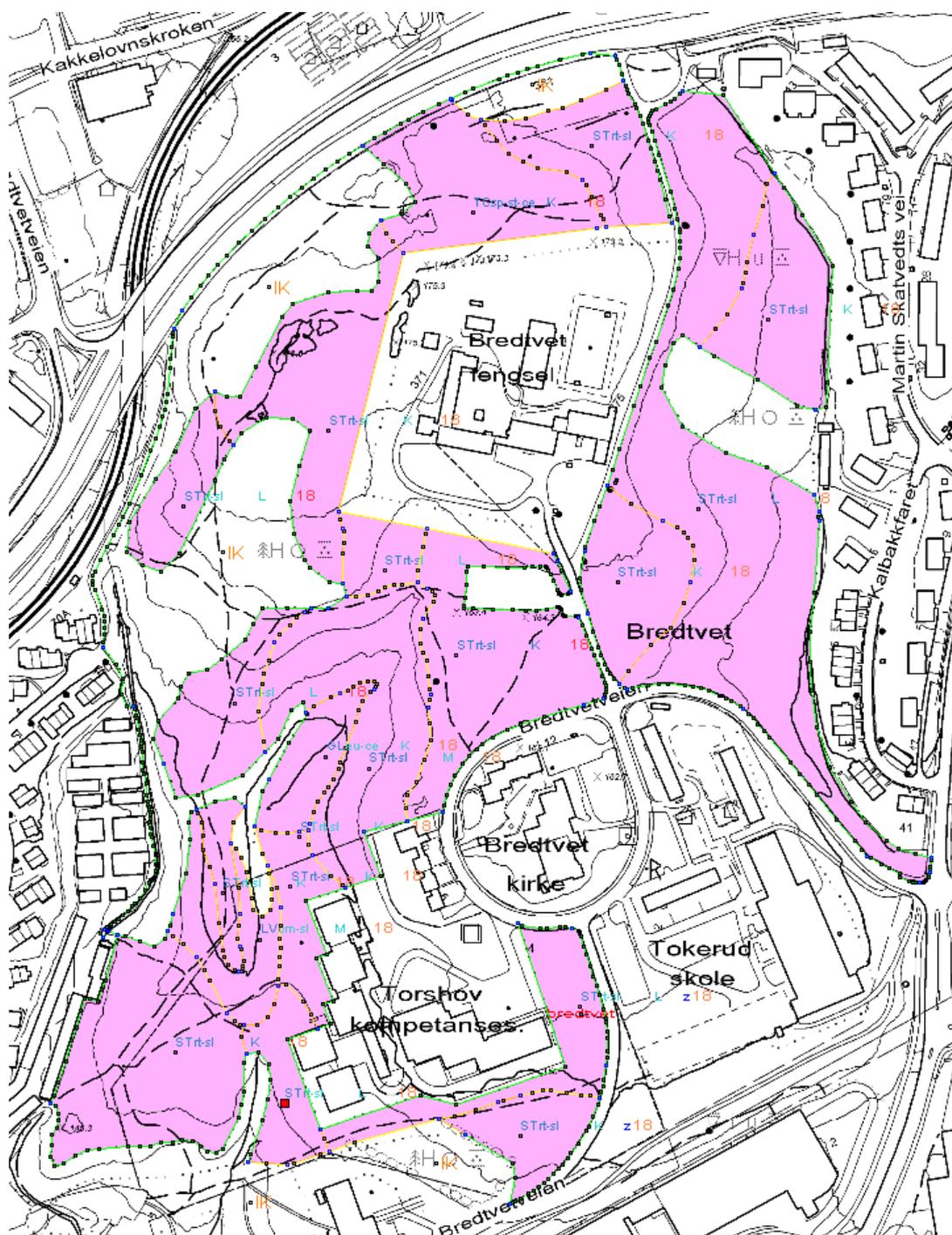
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APPENDIX 1: FIELD MAPS AND RAW SOIL DATA

Bredtvet



Arealfordeling av WRB-enheter, Bredtvet				
WRB-enhet	Areal daa			Sum
	Hellingsklasser			
	0-6 %	7-20 %	21-33 %	
STrt-sl	47,216	36,948	9,489	93,653
GLEu-ce	2,539	0	0	2,539
LVcm-sl	0	0	3,44	3,44
TCsp-st-ce	6,513	0	0	6,513
Sum	56,268	36,948	12,929	106,145

WRB units

Bredtvedt

STrt-sl: Retic Stagnosol (Siltic)

GLEu-ce: Eutric Gleysol (Clayic)

LVcm-sl: Cambic Luvisol (Siltic)

TCsp-st-ce: Stagnic Spolic Technosol (Clayic)

Topsoil texture classes (upper 25 cm)

18: Silty clay loam (*siltig mellomleire*)

Slope classes:

K: 0–6%

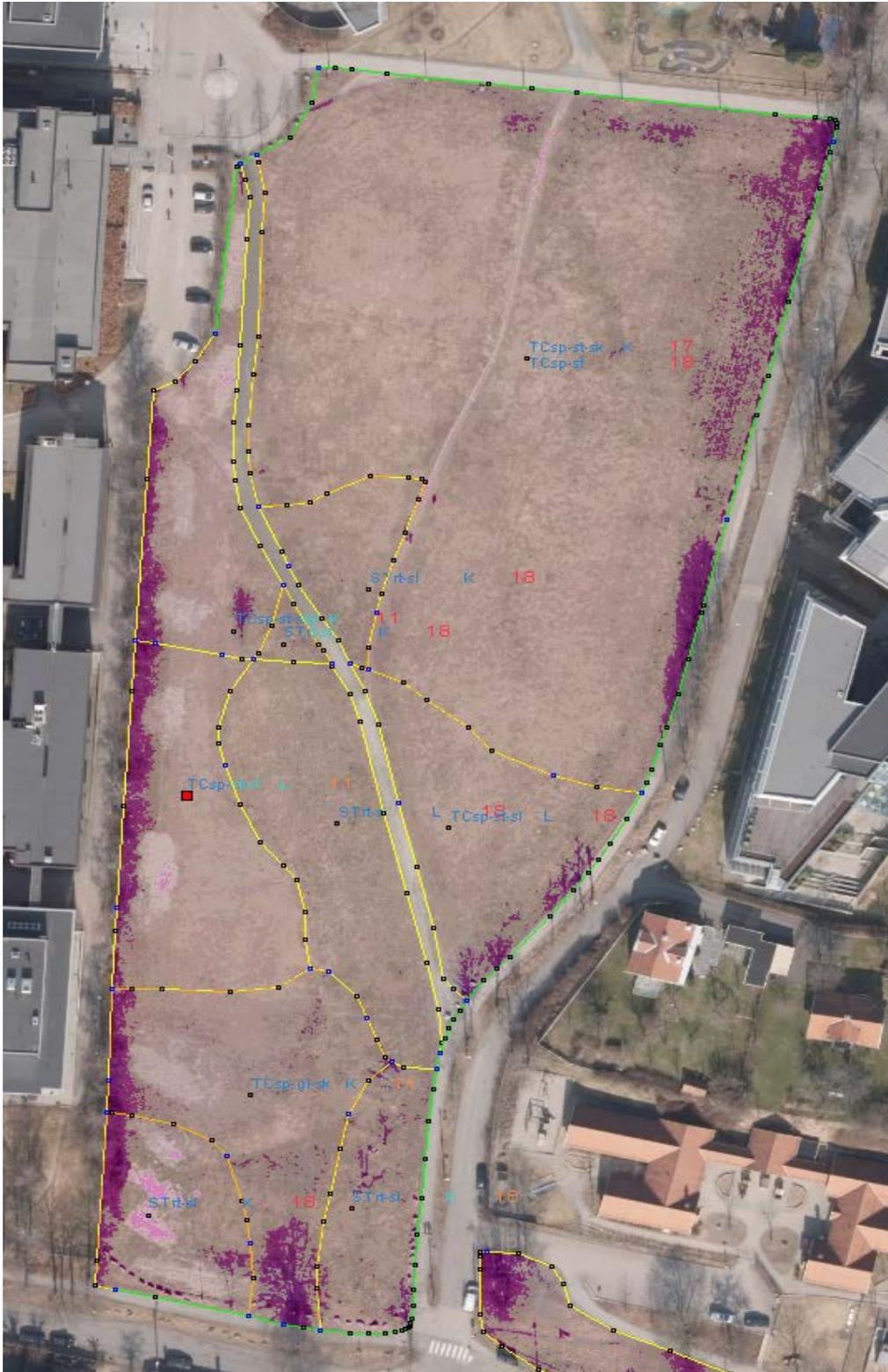
L: 7–20%

M: 21–33%

Other observations

z: minor spots within a map unit with disturbed topsoil due fill material

Gaustad



Arealfordeling av WRB-enheter, Gaustad				
WRB-enhet	Areal daa			Sum
	Hellingsklasser			
	0-6 %	7-20 %	21-33 %	
STrt-sl	2,286	1,56	0	3,846
TCsp-gl-sk	1,799	0	0	1,799
TCsp-st-sk	9,921	0	0	9,921
TCsp-st-skp	1,164	0	0	1,164
TCsp-st-sl	0	3,01	0	3,01
RGdy-hu-sl	1,178	0	0	1,178
Sum	16,348	4,57	0	20,918
Kompl. med TCsp-st				

WRB units

STrt-sl: Retic Stagnosol (Siltic)

TCsp-gl-sk: Gleyic Spolic Technosol (Skeletal)

TCsp-st-sk: Stagnic Spolic Technosol (Skeletal)

TCsp-st: Stagnic Spolic Technosol

TCsp-st-skp: Stagnic Spolic Technosol (Episkeletic)

TCsp-st-sl: Stagnic Spolic Technosol (Siltic)

RGdy-hu-sl: Dystric Regosol (Himic, Siltic)

Topsoil texture classes (upper 25 cm)

11: Coarse, gravelly sand (*grovsand og grusholdig sand*)

17: Loam, clay loam or gravelly clay (*letteire, mellomleire, sandig leire og grusholdig leire*)

18: Silty clay loam (*siltig mellomleire*)

Slope classes:

K: 0–6%

L: 7–20%

M: 21–33%

Other observations

z: minor spots within a map unit with disturbed top soil due fill material

APPENDIX 2: INTERVIEW GUIDES

Interview guide: Schools

1. Introduction

- Presenting myself
- Presenting the research
- Presenting the interview (type, purpose and confidentiality)

Information about the interviewee:

- Name of school
- Type of school (primary school, secondary school, etc.)
- Role of interviewee at school (rector, teacher, etc.)

2. Interest in urban agriculture (UA)

- Does your school have any programmes/plans for gardening activities? (including after-school activities, local food consumption)

<i>If yes:</i>	<i>If no:</i>
<ul style="list-style-type: none"> • Can you explain to me how it works? (place, age, activities, teachers' interest and knowledge, school policy, etc.) • How do you finance the gardening activities? • What challenges do you face during your gardening activities? • Would you like to change the school's gardening location to another (nearer) area? Why (not)? 	<ul style="list-style-type: none"> • What are the reasons for why you do not have gardening activities? • Do you know about any interest at the school in developing UA activities for the children? • Can you describe what UA project(s) the school would like to develop?

3. Resources

The following table lists some resources that need to be in place to develop gardening projects. Please indicate the school's situation for each resource:

<i>Gardening activities funding</i>	<i>Space/land</i>	<i>Gardening materials (including seeds, fertile soil, water, equipment)</i>
<i>Time</i>	<i>Gardening knowledge (knowledgeable teachers)</i>	<i>Enthusiasm</i>

- Did I forget any resources? Please add them to the list.

- What resources are you missing for developing gardening activities?
- Do you have an appropriate space for developing gardening activities?
- Does your school have specialized teachers that develop/could develop gardening projects?
- Have you considered reallocating some of your budget for the promotion of gardening activities?

4. Interest in Gaustad area

- Do you visit Gaustad land with the children during the different seasons? What type of activities do you have?
- Would you like the school to participate in a UA project at Gaustad? What type of UA activities would be interesting for you to have in Gaustad area?
- What are your visions and dreams regarding gardening activities at Gaustad? In what type of UA project would you like to participate in Gaustad area?
- Do you think the school might be interested in an intergenerational project where pupils would engage with other users, for example the elderly?
- What resources would it be possible to allocate to a local gardening project? (money, working time, ...).
- What challenges to the development of gardening activities in Gaustad area do you perceive?
- Would you like to add something more to this interview?

5. Thanks and goodbye

Interview guide: Nursing Homes

1. Introduction

- Presenting myself
- Presenting the research
- Presenting the interview (type, purpose and confidentiality)

2. Characteristics of the nursing home and use of Gaustad area

Here I would like to have a general perspective of the nursing home.

- How many residents are at the nursing home?
- What types of activities are most popular?
- What are the purposes of having activities in the nursing home?
- What do you seek to achieve by promoting activities for the users?
- Do you open the activities to outsiders?
- Is intergenerational socialization part of the purpose of the activities?

3. Interest in and potential for being part of a UA project or green care services

Now I would like to know about your knowledge and opinions towards urban agriculture as a possible activity for the users.

- What are your opinions about including urban agriculture activities for the nursing home users?
- How could urban agriculture be successfully integrated into the nursing home activities?
- What would be the positive outcomes for the users?
- How would urban gardening be a suitable activity for the users of the nursing home?
- What type of urban agriculture projects do you imagine would be appropriate for the nursing home users?
- Have you considered including local organic food in the diets of the users?

4. Challenges

In this case I would like to ask about possible challenges that might appear in the context of your organization and in relation to urban agriculture projects

- What kind of organizational challenges do you see in relation to urban agriculture activities?
- What special requirements are there for the participation of all the users in the activities (e.g. accessibility, mobility ...)?
- What infrastructures would it be necessary to have in order to be accessible to all the users?
- What other challenges have you noticed?

5. Thanks and goodbye



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Cover photos: Gaustad (front), Bredtvet (back) - Cristina Gil Ruiz / NIBIO