Norwegian Ministries

Strategy

Norwegian Strategy for Urban Agriculture

Cultivate Cities and Towns

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FOREWORD

The aim of the government's strategy for urban agriculture is to facilitate urban agriculture through cross-sectoral cooperation. A number of local and regional urban agricultural initiatives have been started in the last few decades. The need for contact with the soil, the satisfaction of growing one's own food and the emergence of new social meeting places are some of the drivers behind these initiatives. The government believes that more people learning about food production and using local produce is beneficial for society.

Urban agriculture is making cities and towns greener and more pleasant. It provides spaces for greater biodiversity, improves public health and increases value creation via new business models for farmers and other producers. It also makes cities more resilient in the face of climate change and increased precipitation. Using cities and towns for cultivation, planting and green structures, often combined with other purposes, should increasingly become a part of urban planning and new business development.

The UN 2030 Agenda and the 17 Sustainable Development Goals (SDGs) provide the government's main guidelines for addressing the greatest national and global challenges of our time. Many of the SDGs cannot be achieved without local input. With its local anchoring, urban agriculture can help Norway achieve many of the SDGs.

The strategy was developed by the Ministry of Agriculture and Food in cooperation with the Ministry of Local Government and Modernisation, the Ministry of Climate and Environment, the Ministry of Labour and Social Affairs, the Ministry of Health and Care Services, and the Ministry of Education and Research.

We would like to thank the Research Council of Norway, Innovation Norway, the business sector, county governors, municipalities, research environments and a number of other organisations for their valuable input and look forward to further dialogue on following up the strategy.

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SUMMARY

The main objective of the strategy is to facilitate urban agriculture in cities, urban areas and towns. The strategy is based on current policy in a number of white papers and other policy documents that contain goals urban agriculture can help to achieve. The government has chosen three focus areas in order to contribute to the objective: sustainable urban and local development, increased knowledge about sustainable food production, and increased sustainable value creation and business development, and has described measures for each focus area.

In order to contribute to sustainable urban and local development through urban agriculture, the government will:

- Produce a guide on urban agriculture in local land use planning, and on planting fruit trees, berry bushes and other edible plants in public parks and green areas
- Assess whether Acts and Regulations need to be amended to better facilitate urban agriculture
- Clarify that urban agriculture is one of the national expectations with respect to regional and municipal planning, which includes encouraging municipalities to facilitate urban agriculture in land use planning

In order to promote increased knowledge about sustainable food production, the government will:

- Produce guidance materials for small-scale urban agriculture and school gardens
- Invite collaboration with immigrant organisations to share knowledge and adapt measures to different food cultures
- Contribute to increased knowledge about urban agriculture through the development of programmes and courses, as well as through informal courses offered by non-governmental organisations (NGOs)
- Contribute to research, competence building and innovation on urban agriculture through existing measures and programmes

In order to promote increased sustainable value creation and business development within urban agriculture, the government will:

- Encourage increased value creation and business development through measures and its efforts within business-oriented measures, subordinate agencies, county governors, county municipalities and municipalities
- Focus on urban agriculture as part of the work on the Food Nation Norway policy

Cross-sectoral and interdisciplinary cooperation at national, regional and local levels will be emphasised in the implementation of the strategy. The ministries will follow up the strategy in their areas of responsibility and an official group will be established to ensure cross-sectoral anchoring in the ministries.

A good dialogue and cooperation with the municipal sector will be required to achieve the strategy's ambitions. County governors have established an urban agricultural network for sharing experience and regional learning. At the municipal level, a cross-sectoral partnership on developing and following up local strategies for urban agriculture has proven to be a successful approach. Municipalities can benefit from this experience by developing their own strategies adapted to fit local conditions.


Losæter, Oslo.
Photo: Vibeke Hermanrud.

Woman planting vegetables

1. INTRODUCTION

What is urban agriculture?

The strategy is based on a broad understanding of the concept of urban agriculture in terms of both activities and geographical delimitation, which includes cities, peri-urban areas and other urban areas. The main emphasis is on cultivation and the opportunities this provides for the sustainable development of Norwegian cities and towns. The Norwegian Institute of Bioeconomy Research (NIBIO) and the Norwegian Veterinary Institute developed a knowledge base for the strategy.

Here, the concept of urban agriculture[1] includes private and public activities related to the production of food, the development of green structure and circular resource use in cities and towns. It includes everything from balcony planter boxes and rooftops to house gardens, allotments, chicken keeping and urban agricultural areas. The activities often combine a number of purposes such as teaching, hobbies, business development and entrepreneurship, social meeting places, public health, integration, food culture and biodiversity, as well as protecting topsoil and green spaces.

Peri-urban agriculture on the periphery of cities and surrounding areas includes traditional agriculture, horticulture, forestry and outfield activities, as well as other agriculture-based industries such as the production of bioenergy and soil products, culture and tourism, gardening and landscape services, local food and beverages, 'Green Care' farms, visitor farms, community supported farms, and horse farms. To the extent that the enterprises' operations and business models are designed to benefit directly from their proximity to a city, they can be considered part of urban agriculture.

The strategy is aimed at the entire range of stakeholders within urban agriculture in both the private and public sectors.

Urban agriculture contributes to knowledge sharing between agriculture and the urban population, the development of meeting places and networks between farmers and consumers and can provide agriculture with more opportunities as a provider of services to urban areas. Sales channels that shorten the distance between farmers and consumers can encourage agriculture to produce what consumers want and teach consumers more about where food comes from.

Cultivating food in cities and towns is not new, although the concept of urban agriculture has emerged in recent years. Before extensive trading in goods started, settlements were usually founded in places where the population was able to secure food supplies in their immediate vicinity, i.e. in areas with good soil and good conditions for cultivation. The first allotments and school gardens were established at the turn of the last century to give city dwellers without gardens an opportunity to grow their own food and to let children experience the joy of nature and learn about cultivation and the plants they ate. During the war, parks and gardens were used for growing food and animal husbandry.

Globally, urban agriculture is on the agenda in many countries and international partnerships.[2]

Potato cultivation in Tørtberg in Frogner Park in May 1944. Photo: NTB scanpix.

1 Urban agriculture is described in various ways in local strategies, research environments and public administration. The description used here is based on these and input received during the development of the strategy.
2 https://medium.com/@Miigle/the-rise-of-urban-farming-cf894db51784

Sustainable urban agriculture

Sustainable agriculture will contribute to economic growth and value creation throughout the country, take the environment into account and make food production resilient in the face of climate change. The goal of sustainable agriculture also includes urban agriculture.

FAO GREEN CITIES INITIATIVE

New thinking is needed when planning cities and towns to make them greener, more resilient to climate change and reuse resources locally. In response to this need, the UN's Food and Agriculture Organisation (FAO) has launched the *Green Cities Initiative*, which is based on experience from integrating agriculture, forestry, fisheries and sustainable food systems in cities and peri-urban areas.[3] The initiative is designed to help transform food systems, prevent hunger and improve nutrition.

SUSTAINABLE FOOD SYSTEMS

The UN defines these as follows: A sustainable food system delivers food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised. It must be profitable, ensure economic sustainability, provide wide-ranging social benefits, ensure social sustainability, have a positive or neutral impact on natural resources and safeguard the environment's sustainability .[4]

3 http://www.fao.org/3/cb0848en/cb0848en.pdf
4 https://www.un.org/zerohunger/zh/content/sustainable-food-systems

Allotments in Bodø. Photo: Ingrid Helen Roaldsen.

2. GOALS AND FOCUS AREAS

The main objective of the strategy is to facilitate urban agriculture in cities and towns.

Based on input from the rest of the world and experience from local work on urban agriculture, the government has chosen to contribute to achieving this goal via the following three focus areas:

1. **Sustainable urban and local development**
2. **Increased knowledge about sustainable food production**
3. **Increased sustainable value creation and business development**

The UN's Food and Agriculture Organisation (FAO) believes urban agriculture is part of the solution to meeting the need for food and addressing climate considerations in the future.[5] The UN 2030 Agenda sets ambitious goals for sustainable development that balance economic, social, and environmental considerations. Urban agriculture can contribute to achieving several of the SDGs, including in Norway. This strategy is based on the SDGs and builds on national goals in several policy areas. The most relevant national goals are within urban and local development, agriculture, health, social welfare, integration, education, climate and the environment. The sectoral policy is anchored in a number of white papers.

Figure 1 illustrates how urban agriculture can achieve goals in a number of areas of society.[6]

5 http://www.fao.org/urban-food-agenda/en/
6 Urban agriculture: multi-dimensional tools for social development in poor neighbourhoods E. Duchemin, F. Wegmuller & A. M. Legault https://journals.openedition.org/factsreports

Why a national strategy?

The proportion of the population that lives in cities is increasing. Some 82 per cent of the population of Norway lived in cities and towns in 2020.[7] The emergence of urban agriculture can help the cities and towns of the future develop in a circular and sustainable direction in line with the SDGs. In addition to food production, urban agriculture can contribute to business development, better resource utilisation, vibrant local communities, a better environment, better public health and greater well-being for large population groups. Topsoil is maintained and more people in the community possess food production skills and knowledge. It also includes an element of public safety and preparedness.

Local strategies developed in, for example, Telemark, Oslo and Bergen demonstrate how local cooperation on urban agriculture provides social benefits in many areas simultaneously, as illustrated in Figure 1. The national strategy is intended to help focus attention on the opportunities offered by urban agriculture and encourage the preparation of regional and local strategies for urban agriculture, knowledge development and outreach, new business development and sustainable food systems.

Chapter 3 describes how urban agriculture can contribute to sustainable urban and local development. The focus area 'increased knowledge about sustainable food production' is discussed in chapter 4 and includes knowledge outreach for the public, sharing knowledge between different environments and developing new knowledge. One key focus area in the green shift is increased value creation and business development. The urban agriculture's potential in this area is discussed in chapter 5.

Neighbourhood Gardens's rooftop farm, 'Tak for Maten' Photo: Mandel & Sesam.

7 https://www.ssb.no/beftett

NEIGHBOURHOOD GARDENS

Photo: Mandel & Sesam.

Neighbourhood Gardens[10] is involved in green and social entrepreneurship, and views urban agriculture as a key element of a sustainability society. Multifunctional solutions to urban challenges are developed through local initiatives and international collaborative projects, from the bottom up. Neighbourhood Gardens creates green jobs for young people, establishes and maintains rooftop gardens, integrates vulnerable groups and is increasing biodiversity in cities.

Neighbourhood Gardens established the first rooftop farm in Oslo, *Tak for Maten*. The *Oslo Living Lab* youth project, in cooperation with H20 upper secondary school, recruits young people for part-time jobs. Youth teams have worked on:

- Cultivation on rooftops and in other projects in Grønland and Tøyen in Oslo
- Beekeeping
- Communication and marketing
- Research
- Food waste and composting
- Events

8 https://nabolagshager.no/

Losæter Oslo. Photo: Vibeke Hermanrud.

3. SUSTAINABLE URBAN AND LOCAL DEVELOPMENT

Urban agriculture can contribute to more sustainable and resilient cities in line with the SDGs and provides opportunities for addressing a number of considerations in urban and land use policy.[9] At the same time, the fact that a number of different purposes may be in conflict with each other as far as the use of finite space is concerned is a general dilemma. Various considerations must be weighed against each other in local land use management in line with the Planning and Building Act. The need for infrastructure, development, densification and land use needs such as urban agriculture must be weighed against other considerations such as soil protection, biodiversity, cultural environments, outdoor life and recreation.

3.1 Considerations and qualities addressed by urban agriculture

Attractive cities and towns

Urban agriculture can result in more attractive and vibrant cities and towns through increased local activity and new social meeting places. It can strengthen cohesion and a sense of belonging, result in better physical and mental health and less transport. At the same time, urban agriculture results in a more varied and greener landscape, cleaner air and less noise. Rooftops can become living areas, include elements of cultivation and be adapted for different types of recreation. Such solutions can make green spaces accessible to people with disabilities, the elderly and others who, for a variety of reasons, have difficulty getting to other green recreation areas.

Local climate adaptation

More green areas, both horizontal and vertical, make cities and towns more resilient in the event of torrential downpours. Plants and soil absorb rainwater and contribute to stormwater management that reduces the strain on wastewater systems. Trees on steep terrain can prevent landslides.

Buildings and asphalt store heat and thereby help to increase surface temperatures in urban areas. Patches of green help to reduce the amount of asphalt and impermeable surfaces and cool down buildings and spaces such that islands of heat build-up are avoided.

Økern Portal, Northern Europe's largest rooftop park covering 7,000 m² with allotments, beehives and recreation areas. Here, children and adults can learn about cultivation and circular systems. Waste from the building will be composted and used as fertiliser. Photo: Christian Grønvold Hansen.

9 The Norwegian University of Life Sciences' project Cultivating Public Spaces https://www.nmbu.no/en/projects/node/34274

Soil and vegetation act as a buffer and do not retain heat in the same way as buildings and asphalt. Green rooftops and facades provide an insulating effect that can contribute to less energy consumption for heating and cooling and provide more energy-efficient buildings.

Green infrastructure, biodiversity and cultural environments

For historical reasons, cities and towns are often located in areas with good soil and favourable climatic conditions for plant growth. The indigenous biodiversity of such areas is rich and good for agriculture. Both wild and cultivated nature are under pressure from the growth and development of cities. The dividing up of habitats and inability to move between them is a problem for many insects, frogs, salamanders and mammals. Green corridors between habitats are therefore important. Urban agriculture increases the prevalence of green elements and can create positive corridors and links for the existing biodiversity in urban ecosystems. Good land use planing can create such corridors by making use of opportunities for establishing and retaining more species-rich and varied environments with a combination of useful plants and indigenous wild plants.

Urban development with larger elements of urban agriculture can provide vital habitats for insects and pollinators in natural, agricultural and urban ecosystems, and thereby better opportunities for pollinating crops and wild plants. At the same time, it is important that urban agriculture does not displace natural vegetation and indigenous species with habitats in cities and towns. For example, urban beekeeping must take account of any competition with wild pollinators with respect to access to food. Urban agriculture can help reduce the downscaling and fragmentation of natural areas, green structures and biodiversity that are important for various ecosystem services and for plant and animal life.

More green areas and increased species diversity provide insects with both habitats and opportunities to spread between larger natural areas. Urban agriculture in the form of grazing animals and traditional haymaking helps to restore and retain species-rich habitats such as pastures and hayfields. Account must be

Early summer in Kristiansand. Photo: Margrete Havstad.

taken of historically important gardens, parks and other green areas, as well as other historical culturally important urban spaces, streets and squares, to the extent that these are impacted by urban agricultural initiatives.

Developing green infrastructure and restoring management-intensive habitats provide a basis for binding carbon, climate adaptation, food production and biodiversity (nature-based solutions). Green areas mitigate both droughts and flooding while increasing species wealth and habitats. Examples of nature-based solutions include species-rich meadows for rooftop honey production, restoring wooded grassland[10] for local food production and using grazing animals in suitable green spaces.

Conserved native plants and domesticated animals

Genetic diversity is an important component of biodiversity that also includes the diversity of our native plants, domesticated animals and forest trees. Small areas of land, which are often managed more manually and organically, are highly suitable for growing heritage plant varieties (agriculture's historical plant diversity). Conserved poultry and rabbit breeds may be suitable for use in urban animal husbandry and conserved ornamental plants, fruit trees and berry bushes may be relevant for use in connection with historic buildings, gardens and parks. This enables urban agriculture to help maintain and further develop our genetic reserves, which may be useful for future food supply.

Reduced noise and pollution

All vegetation helps to clean the air and reduce dust. More green areas will contribute to more air purification. Vegetation on walls and other vertical surfaces (e.g. benches with backrests of greenery) absorbs sound, thereby reducing traffic noise by reducing hard surfaces that propagate and direct noise. Food produced locally where people live can help shorten transport distances to consumers and thus lower greenhouse gas emissions.

At the same time, it is important to note that nutrient and soil runoff from urban agriculture can have a negative impact on aquatic environments and ecosystem services related to aquatic environments.

10 different conserved potato varieties cultivated in KVANN's vegetable reserve in Væres Venner Felleshage allotments in Trondheim.
Potato varieties shown in the photo, top row: Truls, Shetland Black, Tysk Bla, Hroars Drege, Gjernes Potet
Bottom row: Red from Skjåk, Beate, Ivar, Kerr's Pink Blue, Brage
Photo: Stephen Barstow

10 Wooded grassland is a type of pasture with natural grassy knolls and scattered trees. https://snl.no/hagemark

Soil protection

Soil protection in Norway is about, among other things, protecting the ability of the population of Norway, and that of our descendants, to grow their own food on their own land. Therefore, it is very important to protect topsoil as a resource for future generations. Much of the best topsoil can be found in and around cities and towns where development pressures are enormous and achieving the national goals concerning the reduction of topsoil is challenging. Urban agriculture can help to maintain food production on topsoil that is at risk of being rezoned. For example, establishing community supported agriculture near to urban areas can result in greater local ownership of topsoil. Urban agriculture can also strengthen soil protection indirectly through increased knowledge about Norwegian agriculture's importance for food production, recreation and cultural landscapes, and thereby increase the understanding of the importance of topsoil.

Public health, quality of life and sense of community

Urban agriculture contributes to better public health. Views of trees and green spaces have a number of positive effects on physical and mental health.[11] Experience from urban agricultural role models in the City of Oslo suggest that the effects on public health indicators such as a sense of community and belonging, inclusion and integration, well-being and physical activity are unambiguously positive. Surveys show that urban agriculture is highly suited to creating good meeting places around healthy activities in a local environment.

Physical activity in green surroundings, access to fresh vegetables and the social meeting places are each healthy in their own way. A healthy diet is important for maintaining good health. A poor diet is one of the main risk factors for developing cardiovascular diseases, cancer and diabetes.[12] Understanding the relationship

RINGSAKER ASSOCIATION OF RURAL WOMEN

Photo: Inger Amb.

Ringsaker Association of Rural Women's inclusion project, *Bæta'n - kvinnenettverk på åkeren*. Women from 11 different nations growing vegetables on allotments. The landowner, Hans Frogner, has lent 2,000 m^2 of land for the project. The project is part of the Norwegian Association of Rural Women's *Kvinner UT* project in which the goal is to establish networks and common meeting places that increase the participation of women from minority ethnic groups in local communities.

11 Ward Thompson, C. Roe, J., Aspinall, P., Mitchell, R., Clow, A. & Miller, D. 2012. Ward Thompson, C. Aspinall, P., Roe, J., Robertson, L. & Miller, D. 2016.
12 https://www.fhi.no/globalassets/dokumenterfiler/rapporter/2019/ti-store-folkehelseutfordringer-notat-2019.pdf

between diet and health, cultivation, using produce and cooking is a prerequisite for being able to develop a healthy diet. Cultivating and producing one's own food and produce can increase respect for the value of that food as a resource and help to reduce food waste.

Participation in communal urban agricultural activities with neighbours and other residents of the local community can prevent alienation and loneliness. Major projects like City Farmer and visitor farms also contribute to this. Therapeutic horticulture can be used in the treatment of physical and mental disorders, and as an offer for the elderly and dementia sufferers.

Inclusive green cities and towns thanks to social entrepreneurship

Social entrepreneurship is about developing and adopting new solutions to welfare and social problems. It is about developing new networks across disciplines and activity models and about working together in new ways. Social entrepreneurs can, through practical experiences and their networks, have advantages compared with traditional public solutions.

Participation

User-oriented urban development where residents help to shape their local environments by establishing urban agriculture creates a sense of belonging and brings people from different economic, social and cultural backgrounds together. The Planning and

DR. DEDICHENS GRØNNE TORG

Photo: Linda Vasaasen.

Foreningen for Dr. Dedichens Grønne Torg is based in Trosterud in Oslo. It focuses on creating activities and life on the old hospital site, which for many years has been marked by empty and decaying municipal buildings. The society facilitates concepts, projects and engagement among the public and contributes to a vibrant local environment. Their base is a previously empty greenhouse that functions as an open, social meeting place with urban agriculture as the common denominator. In the area initiative in Oslo[19], Områdeløft Trosterud og Haugerud have a cooperation agreement with the society on local environmental development. The entire area is being upgraded and will gain a new culture park in which the greenhouse will have a central place.

13 https://www.oslo.kommune.no/byutvikling/omradepolitikken-i-oslo/#gref

Building Act sets out requirements for participation in planning. It gives the public opportunities to provide input on which solutions should be chosen. This provides a better basis for decision-making for planners and politicians, for example, by providing knowledge about the public's existing use of streets and urban spaces, and their wishes regarding cultivation, recreation spaces in residential streets, communal areas, etc. in their neighbourhoods.

The everyday landscape

The European Landscape Convention covers all landscapes including urban agricultural ones. Landscape is important for people's quality of life, whether that be in urban areas, sparsely populated areas, areas that have experienced low value due to impacts or decay, in everyday environments, as well as in areas that are especially valuable. Norway has committed to including landscapes in its rural and urban planning policy and in its policies for culture, environmental protection, agriculture, economics and social areas, as well as in other areas that may have a direct or indirect impact on landscapes[14]. Urban agriculture can play an important role in the follow-up of the European Landscape Convention in terms of residents' quality of life, as well as when it comes to preserving natural and cultural environmental qualities in and near cities and towns.

Work training and getting people active

Norwegian Labour and Welfare Administration (NAV) offices in municipalities can make use of both national and municipal measures with respect to people excluded from the labour market due to unemployment, health problems or social challenges. Users with a need for assistance have the right to participate in the development of a concrete plan regarding how they can get back into work (activity plan). Urban agricultural enterprises can be suitable providers of work training. Work training is a scheme in which participants receive on the job training with individual follow-up from NAV and the employer. For people registered with NAV offices, urban agriculture can be an arena for social training, Norwegian language training or activity. Work assessment allowance recipients can, for example, participate in activities organised by NGOs that are suitable for strengthening their ability to transition to work.

3.2 How to facilitate urban agriculture in land use planning

The goals of the strategy can only be realised through cooperation

Realising the strategy's goals will require a comprehensive and interdisciplinary approach in which the cooperation and participation of a broad range of different stakeholders, regionally and locally, must be emphasised. Given their responsibility for regional and local planning, county authorities and municipalities have an opportunity to play a key role in following up the strategy. County governors will be natural partners. The same applies to property owners and developers.

It will be important for municipalities to work with owners of buildings and plots, developers, housing cooperatives, various business actors, NGOs, sports clubs and the residents in relevant areas. At the same time, cooperation across disciplines is important in ensuring that the potential social benefits can be realised. The various stakeholders will also benefit from cooperating on sharing experience, increasing knowledge and the actual operation of urban agriculture. The county governor of Vestfold og Telemark has published a guide on developing urban agriculture projects.

UNIKUM

Unikum works for an inclusive labour market. Individual follow-up, mapping wishes and interests, career and study guidance, training and qualification, clarification of capacity for work and adapted work create opportunities for jobseekers and employees – either in cooperation with Oslo's numerous employers or by offering work in Unikum. Unikum works with the business sector and assists partners with both staffing and guidance in areas such as workplace facilitation. Jobseekers with undetermined or reduced capacity for work receive assistance with finding and using their resources in a meaningful way. To Unikum, work is a social arena for leaning life skills, greater self-esteem and community participation.[15]

14 Ref. Article 5(d) of the European Landscape Convention.
15 https://unikum.no/

Comprehensive land use planning

Further developing urban agriculture entails using spaces in cities and towns in new and different ways. These could be flower beds, squares, lawns, parks, undeveloped plots and the walls and rooftops of various buildings. These spaces are owned and operated by various public and private actors. This means there is a need for comprehensive planning and a cross-sectoral approach in which different stakeholders in the public, private and voluntary sectors are involved and work together to realise the potential of urban agriculture. Regional and municipal plans are important tools in which urban agriculture can be incorporated and anchored. The plans can set limits for land use that are coordinated with other purposes and considerations.

Regional planning

Regional planning considers public transport measures and infrastructure, housing and business development, education, soil protection, nature reserves, coastal zones and watercourse management, green infrastructure and footpaths and cycle paths that run across municipalities. Urban agriculture may be relevant in several of these areas. County authorities can be both owners and tenants of commercial buildings, and thus represent various roles that should be involved in the cooperation on cultivation in these areas.

Local Planning

The municipalities' plans must be in line with regional plans and national land use policy. The municipalities' overarching planning includes a social part, a land use part and an action part. Policy goals and development characteristics are anchored in the social part. Discussions about urban agriculture can be included as part of the social part of municipal master plans where one discusses which areas should or can be used for the purpose. The land use part follows this up through provisions that state for what the various areas in the municipality will be used. The municipality can specify provisions and guidelines in the land use part of the municipal master plan concerning how green infrastructure and urban agriculture can be incorporated into individual projects and in the case of densification, transformation and new development areas. The provisions in the municipal master plan must be complied with in detailed plans so that the municipal can quickly and simply accept plans and make decisions in individual cases.

Municipalities shape the physical environment through planning and solutions for locating parks, larger and smaller green spaces and residential areas with communal areas, and through designing the details of streets, squares, green spaces and residential areas. Which buildings, rooftops, urban spaces and land one

Stortveitmarken allotments in Bergen – snail fence on pallet frames. Photo: Frøydis Lindén.

deems suitable for urban agriculture, as well as the location and design of the initiatives, must take account of the specific location and any considerations in the area. For example, cultural heritage site and cultural environment considerations, landscape assets or natural assets. This requires the municipality to have expertise in these areas. Establishing cooperation across agencies and sectors, inside and outside the municipality, is useful and can help to clarify interests, the ownership of plots, type of zoning of various sites, participants, roles, goals, target groups and timetables. Using development agreements between landowners and municipalities may be a means of allotting specific outdoor spaces in new construction projects stated in the plan to urban agriculture, either for permanent or temporary use. A guide will be produced on urban agriculture in local land use planning that provides a more detailed description of the opportunities afforded by the Planning and Building Plan.

3.3 Temporary or permanent land use

The increased interest in urban cultivation and the fact that many people have nowhere to grow food means that demand for allotments and the desire to use residual spaces will increase. Many areas are lying unused. The future use of the area may not have been clarified or the owner may not be using the area. The temporary cultivation of such spaces represents a sustainable use of resources and this has been done in many places.

Municipal master plans can allow areas that are temporarily lying fallow to be used for urban agriculture. Nonetheless, cultivation of these spaces will not be permitted without a special agreement with the landowner concerning the use of the space for urban agriculture. At the same time, it is important that possible options for future land use are kept open and not restricted by such temporary use.

The government will:

- Produce a guide on urban agriculture in local land use planning, and on planting fruit trees, berry bushes and other edible plants in public parks and green areas
- Assess whether Acts and Regulations need to be amended to better facilitate urban agriculture[16]
- Clarify that urban agriculture is one of the national expectations with respect to regional and municipal planning, which includes encouraging municipalities to facilitate urban agriculture in land use planning.

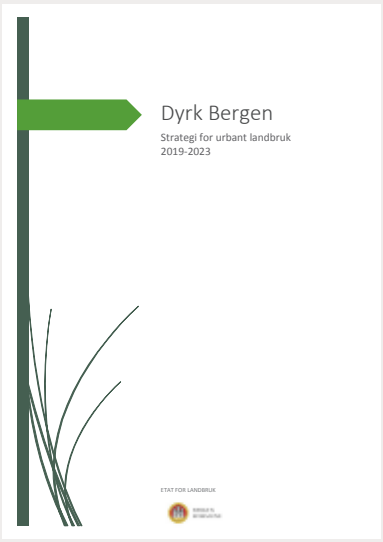
Shareholders in Fornebu Samdyrkelag learning that common marigold should be thinned out in order for it to produce new flowers throughout the season. The cultivation cooperation is run by U.Reist on a site that OBOS (Oslo Housing & Savings Association) has made available until it is going to be built on. Photo: Kjetil Korslien.

16 For example the Planning and Building Act, the Regulations on Fertiliser Products and regulations in the area of food.

HOW CAN MUNICIPALITIES FACILITATE CROSS-SECTORAL GOAL ACHIEVEMENT THROUGH URBAN AGRICULTURE?

- Establish cooperation on urban agriculture across agencies and sectors
- Develop a municipal strategy for green infrastructure and urban agriculture in the social part of the municipal master plan
- Specify provisions and guidelines in the area part of the municipal master plan for how green infrastructure and urban agriculture can be incorporated into individual projects, in the case of densification and transformation and in new development areas.
- Prepare a map of spaces that can be used for urban agriculture, including plots and rooftop spaces, or empty buildings and cellars. Secure areas through zoning.
- Consider green spaces, such as parks, residual spaces, temporarily unused areas and rooftops, for growing food plants, or offering residents allotments or community supported farms. Facilitate multipurpose green spaces.
- Ensure that provisions for relevant 'green measures' are incorporated into all zoning plans in the form of specific requirements for the square metres of available cultivation areas per dwelling, green facades, rooftop gardens, etc. in addition to established measures such as the smallest outdoor area (MUA) and green structure purposes pursuant to section 12-5(3) of the Planning and Building Act .
- Introduce clear guidelines for investigating green rooftops in construction projects. In order to realise green intensive and extensive rooftops, the measure must be looked at early on in the planning phase of new buildings and area development projects.
- Facilitate and be a dialogue partner between cultivation stakeholders and landowners
- Establish local cooperation on urban agricultural projects for work training, integration and social work
- Facilitate the local reuse of resources from food and garden waste
- Develop infrastructure in residential areas that facilitates the environmentally safe and healthy circular reuse of nutrients and water and the utilisation of waste heat
- Increase the use of nature-based solutions with blue-green infrastructure that is good for biodiversity, climate adaptation and urban agriculture, ref. chapter 4.3 of the national planning guidelines for climate adaptation

EXAMPLES OF LOCAL STRATEGIES INCLUDE SPROUTING OSLO, CULTIVATE BERGEN, STRATEGY FOR URBAN AND PERI-URBAN AGRICULTURE IN TELEMARK



Click on the photos to download them.

School garden at Tingvoll Farm, NORSØK. Photo: Kirsty McKinnon.

4. INCREASED KNOWLEDGE ABOUT SUSTAINABLE FOOD PRODUCTION

Direct links to agriculture are diminishing with each new generation. This means that the public's knowledge about agriculture and food production is decreasing. At the same time, the public is becoming increasingly interested in the origin of food and its importance for health, food safety, the climate and the environment. More people want to participate in the production of food from plants and animals for their own and the consumption of others. This trend is providing new opportunities for building relationships between people in cities and towns and practitioners in professional agriculture. Those who take part in urban agriculture learn to value the quality of the produce and gain an insight into the work required to produce good produce. This can contribute to a better understanding of the fact that the framework conditions society provides for agriculture are crucial when it comes to what consumers can demand with respect to the products they want agriculture to deliver.

Urban agriculture can contribute to more people in society having an understanding of cultivation and make us less vulnerable to rapid changes in food supplies. This knowledge can also contribute to a greater appreciation of food and result in more people throwing away less food.

4.1 Food production as an arena for learning and life skills

In school gardens children can learn to grow edible plants and make tasty, nutritious dishes, and not least develop a deep understanding of concepts such as organic, locally sourced, soil protection, fair and sustainable. A school garden does not have to be large. It can involve small beds or seedling boxes that can be placed in a kindergarten's outdoor area or in a schoolyard. The unique aspect of school gardens is that they have the potential to reach everyone. The knowledge acquired in a school garden, from as early as kindergarten age, is important for the future sustainable development of society.

Many municipalities have established school gardens as an arena in which children and young people can learn how to cultivate the soil, grow vegetables and fruit, harvest and use the crops in cooking. School gardens can be viewed in connection with the Framework Plan for Kindergartens and the National Curriculum in Primary and Secondary Education and Training. The Norwegian Centre for Science Education[17] has its own webpages on how school gardens and food cultivation can be used in kindergartens' work and in teaching in schools.

The Framework Plan for Kindergartens describes kindergartens' core values that must be disseminated, practised and experienced in all parts of the educational work. The core values describe sustainable development and state, among other things, that children must learn to take care of themselves, each other and nature. Kindergarten must contribute to children's love of nature and gaining of experience that promotes an ability to orient themselves and experience nature in the different seasons. The framework plan also clarifies that kindergarten plays an important part in promoting values, attitudes and practice for a more sustainable society.

In 2020, schools adopted a new national curriculum[18]. The overarching part of the core curriculum states that pupils should get to experience nature and view it as a source of benefits, joy, health and learning. It also states that formation takes place through experiences and practical challenges in education and the ordinary school day.

Three new interdisciplinary topics have been introduced as part of the subject renewal: democracy and citizenship, sustainable development and health and life skills. The theme of sustainable development is about ensuring that pupils will learn to protect life on earth and address the needs of people alive today without destroying the ability of future generations to meet their needs. Through their work on the theme, pupils must develop skills that enable to them to make responsible choices and act ethically and with environ-

17 https://www.naturfag.no/tema/vis.html?tid=2113108
18 https://www.udir.no/laring-og-trivsel/lareplanverket/

mental awareness. According to the new curriculum for natural science, pupils must learn to take part in harvesting and using natural resources and discuss how natural resources can be used in a sustainable manner, while in food and health they should learn to use local foods in cooking and present the links in the production chain from raw produce to meal. These goals are examples of relevant learning outcomes after year 4 in both subjects.

Kale harvesting at Århus Farm, Skien. Photo: Hilde Amy Tele.

NORSØK's school garden at Tingvoll Farm. Photo: Kirsty McKinnon.

SCHOOL GARDEN'S HISTORY IN OSLO

School garden in Bondejordet in Frogner, Kristiania in 1907 and 1909. Photo: Anders Beer Wilse, National Library of Norway.

The first school garden was established in 1906 in Bondejordet, Lille Frogner, and the municipality took over in 1909. The municipal executive board decided that part of Geitmyra in Sagene could be used as school gardens for inner city children. At its peak the activities covered 90 schools with the participation of around 4,000 children a year. Four gardeners and a principal were employed in full time positions together with around 150 teachers on a part-time basis and summer temps. The school garden nursery in Geitmyra supplied plants for planting in gardens and botanical beds, and for indoor plant care in schools.

The work always took place after normal school hours and increasing the supply of food was always a key factor. School gardens were very popular in the post-war period, although their popularity decreased during the 1980s and many school gardens were closed down. At the end of 1988, a decision was made to sell the site but the decision was controversial and resulted in the sale of the properties not going through. The current mode of operation started after 1992. The level of interest and use has since increased and in school gardens started receiving municipal grants again from 1993.[19]

19 https://oslobyleksikon.no/index.php/Skolehager

School gardens and other cultivation activities can be an educational tool that facilitates play and learning in kindergartens, schools and out-of-school-hours care. School gardens and other educational programmes in which nature, agriculture and cultivation form part of the educational activities can contribute to children's formation and education. Cultivation is a central part of the project 'Matjungelen' in which children can learn practical and theoretical skills about a nutritious and sustainable diet through play and activities in out-of-school-hours care. School gardens can also be suitable arenas for physical activity in everyday school life. The methods they want to use are chosen by the kindergartens and schools themselves.

NURSERY AT BYGDØ ROYAL FARM

Photo: Haakon Harris, Norsk Folkemuseum.

The nursery at Bygdø Royal Farm is a resource centre for urban and peri-urban agriculture. The centre's mission is to provide inspiration and carry out knowledge outreach regarding diversity in agriculture, urban agriculture, farming cycles, organic cultivation and processing food, as well as to be a living green meeting place. It also has an apple orchard containing conserved varieties. The nursery at Bygdø Royal Farm works with Unikum, which offers work training. See the section on Unikum on page 20.

THE GREEN SCHOOL

The Green School[21] is a collaborative project between 4H Norway, 4H Farm Norway and the Norwegian Farmers Association. The website is a resource bank containing fact pages about Norwegian food production aimed at children, and a topic bank with ready-made educational programmes based on the curriculum. The goal is to give teachers, 4H club leaders and others access to activity and learning programmes such that the teaching can take place on a farm or out in nature, or the farm and nature can be brought into the classroom. The texts and programmes are created with the help of teachers and student teachers, and also taken from 4H projects. Stories and pictures are collected directly from Norwegian farmers and other experts on Norwegian agriculture. The materials are adapted for use by years 1 to 10, both inside and outside schools. The project is supported by the Norwegian Environment Agency through the Natural School Bag.

Expert environments for urban agriculture

A number of actors around the country disseminate knowledge about urban agriculture. Peri-urban farms, City Farmer and some research environments hold courses for the general public. Many 'Green Care' farms offer cultivation activities for various user groups of all ages for schools, kindergartens, work training, people with dementia, respite services and integration. The Norwegian University of Life Sciences (NMBU) offers a bachelor's degree, teacher training and continuing education. From 2021, a master's degree in urban agriculture will be offered that covers the entire spectrum from urban planning, biowaste in the waste cycle, cultivation, technology, innovation and economics. A national, decentralised support scheme has been established to contribute to skill development measures for teachers[20]. See Appendix 2 for examples of expert environments within urban agriculture.

4.2 Recruitment to agriculture and other green industries

Norwegian agricultural policy is intended to contribute to food production, settlement, employment and value creation throughout the country. The stable recruitment of qualified practitioners is important for achieving its goals. The Agricultural Agreement[22] is the government's main contribution to the provision of good framework conditions and a basis for increased profitability in agriculture.

Norwegian agriculture is a knowledge intensive and skills demanding industry. Therefore, it is important to facilitate a good education and continuing education system in agriculture. Almost all county authorities offer agricultural education in upper secondary school under the education programme Agriculture, Fishing and Forestry, and many county authorities offer vocational school programmes in various agricultural subjects. At the university and university college level, three institutions offer agricultural programmes: Nord University, Inland Norway University of Applied Sciences and the National Centre for Urban Agriculture (NMBU). Besides the increasing interest in agronomy studies, NMBU has seen a clear increase in applicants for plant science.

The national model for adult agronomy[23], funded through the Agricultural Agreement, has now been established at 20 of the country's agriculture, fishing and forestry schools spread across nine county municipalities. The scheme also covers horticultural training for adults and is in demand among practitioners and others. Agriculture as a whole and the individual practitioners are the most important and best ambassadors for recruitment to the industry. At the same time, it is important that agriculture-related programmes and adult agronomy are relevant for groups other than those who have entered the industry or who plan to focus on agriculture as a professional career. This helps improve competence among the public.

4.3 Knowledge sharing

The agriculture industry, research and expert environments, public administration, NGOs and hobby farmers all have important skills to contribute in the development of urban agriculture. Cooperation projects open arenas for co-creation within sustainable urban and local development, value creation and food production. Knowledge should be shared across and between the

THE NATIONAL CENTRE FOR URBAN AGRICULTURE (NCUA) AT THE NORWEGIAN UNIVERSITY OF LIFE SCIENCES (NMBU)[24]

The centre's mission is to promote research and education into the social, environmental, economic and organic aspects of urban agriculture and a sustainable circular economy. The growth of urban agriculture and alternative food systems is a worldwide phenomenon that has caught the attention of policymakers, activists and investors as a new answer to questions about food security, economic development, combatting poverty, urban development, waste recovery and environmental protection. All of the faculties at NMBU have joined forces to cover the entire subject area and form the centre, which is a driving force behind the new master's degree in urban agriculture.

20 https://www.udir.no/kvalitet-og-kompetanse/lokal-kompetanseutvikling/desentralisert-ordning/desentralisert-ordning/
21 https://dengronneskolen.no/om-den-gronne-skolen/
22 The Agricultural Agreement is a result of the annual agricultural settlement between the State and two agricultural organisations, the Norwegian Farmers Association and the Norwegian Farmers and Smallholders Association and is adopted by the Storting (the Norwegian parliament) as an amendment to the national budget under the Ministry of Agriculture and Food.
23 Adult agronomy is a two-year adult education course within agriculture and gardening.
24 https://www.nmbu.no/fakultet/biovit/forskning/store-forskningsprosjekt/urbant-landbruk

stakeholders. Both hobby farmers and commercial producers need to know about sustainable production methods, how to use inputs, food safety, animal welfare and animal and plant health. The same applies to increased knowledge about reusing resources such as organic waste, cultivation media, water and nutrients.

Ensuring that food is safe to eat requires knowledge about proper cultivation, composting, harvesting, storage and preparation. It is important to learn about cultivation methods that do not involve chemical plant protection products and how to use inputs such as fertiliser correctly in order to mitigate the risk of urban agriculture having negative environmental impacts. The use of disease-free plant materials, e.g. certified seed potatoes, is important to avoid the spread of plant diseases. Knowledge about harmful invasive species and how one can facilitate good conditions for pollinators is important for all farmers.

Appendix 1 discusses food safety and other considerations. It also provides an overview of the regulations and policy documents relevant to urban agriculture.

With ever more people getting involved in farming, both as a business and as a hobby, there is a need to disseminate such knowledge. Information about regulations, cultivation methods, variety selection and practical tips are all important and welcome for those who start off with little knowledge and experience. Using certified seed potatoes is important (and a statutory requirement) to avoid spreading plant diseases. The organisation Norwegian Seed Savers (KVANN), in cooperation with the Norwegian Genetic Resource Centre at NIBIO, distributes potato tubers from historical potato varieties from Overhalla Klonavlssenter, which is popular with hobby farmers.[25]

Kindergarten Lier Municipality. Photo: Anita Panman.

NORSØK

The private, independent foundation the Norwegian Centre for Organic Agriculture (NORSØK) is a national centre for the development of organic agriculture through interdisciplinary research and outreach. NORSØK also manages an organic farm, Tingvoll Farm. The work is based on the international principles of organic agriculture: health, ecology, fairness and care. NORSØK contributes knowledge for increasing the sustainability of agriculture and society. NORSØK has both basic and advanced research expertise and provides consulting and outreach services. Its main areas of expertise are organic agriculture and food production, environmental science, sustainability and renewable energy.

25 https://kvann.no/planteutveksling/potetprosjektet/

A lot of practical knowledge can be found on various websites, blogs and similar. The Royal Norwegian Society for Development is developing a website[26] that will provide an overview of news, events, resource persons, available technology, research results and stakeholders within urban agriculture.

4.4 Knowledge needs

Research, development and innovation

In addition to disseminating existing knowledge in a collaboration between different stakeholders, there is a need to develop new and interdisciplinary knowledge about sustainable urban food production. Research, development and innovation can contribute to basic knowledge about cultivation in cities and towns and lay the basis for value creation. The Research Council of Norway, Research Funding for Agriculture and the Food Industry and SkatteFUNN have measures for further developing knowledge-based urban agriculture. The types of project that stand out in particular are skills and cooperation projects that aim to develop new knowledge and build research expertise that society or the business sector needs to resolve important societal challenges. The type of application requires project cooperation between research environments and relevant stakeholders in the research sector. The projects can benefit from an interdisciplinary orientation and involve cooperation between environments within, for example, technology, agricultural and food subjects, health sciences, land use planning and social science. Innovation projects in the business sector are also relevant.

Internationally, there are several relevant measures for research and innovation in urban agriculture. For example, urban agriculture is covered by the EU's

THE PROJECT SIEUGREEN

Photo: Christel Munster.

Norway leads the Sino-European Innovative Green and Smart Cities (SiEUGreen) research project under the EU Horizon 2020 programme in which 15 European and five Chinese partners are collaborating on interdisciplinary research and innovation within urban agriculture and use of the circular economy. NMBU and NIBIO are the main stakeholders in Norway. The goal is to promote urban agriculture with a view to greater food security, resource efficiency and smarter, more resilient cities. Various cultivation techniques are being demonstrated on the ground and on balconies, rooftops and terraces in Norway. A circular system demonstrating the entire cycle is under construction. This will show how a city's biological wastewater and waste resources can become safe fertilisers for both urban and traditional agriculture. Local solutions are often less vulnerable than large systems, and computer technology makes monitoring easy. The project aims to demonstrate solutions in which water and energy consumption is reduced to one tenth of its current level, without loss of comfort.

26 https://www.urbantlandbruk.no/

KEY KNOWLEDGE NEEDS

Increased knowledge about sustainable cultivation methods and inputs
- Good cycles for nutrients, fertilisers, soil and water
- Composting organic waste to produce sustainable growth media and alternatives to peat
- Plant varieties and domesticated breeds that are suitable for urban agriculture, including conserved materials
- Alternatives to chemical plant protection products
- Alternative water sources that reduce tap water consumption and meet the requirements for hygiene and a good environmental status.

Increased knowledge about environmentally safe and healthy food production in urban environments
- How food production is affected by urban environments, for example by pollution from traffic and industry or access to pollinators
- Safe production, handling, processing, storage and use of food from urban agriculture, both privately and commercially
- Possible challenges related to urban food production, such as the use of chemical plant protection products and nutrient runoff

Increased knowledge about urban agriculture in societal and business development
- Interdisciplinary research and technology development related to how and to what extent urban agriculture can contribute to a circular economy, including the integration of biogas production in local recycling processes
- The importance of urban agriculture for physical and mental health and quality of life
- How urban agriculture can be aligned to contribute to nature-based solutions[30]
- How school gardens can be used across the country
- Urban business models for farmers and other producers in cities and peri-urban areas

research programme JPI[27] Urban Europe and will be relevant in the EU's next framework programme for research and innovation Horizon Europe (2021-2027). Urban agriculture will form part of the focus of the new partnership Driving Urban Transitions (DUT), which JPI Urban Europe is preparing together with the European Commission.

The researcher network COST Action Urban Agriculture Europe[28] started receiving funding as early as 2012-2016 from the EU's Seventh Framework Programme for Research and Innovation. Among other things, the network has resulted in a declaration concerning the relationship between urban agriculture and the EU's common agricultural policy.[29]

Identified knowledge needs

Further developing urban agriculture and exploring the opportunities for social benefits requires new knowledge about technology and methods, sustainable cultivation methods and social themes such as quality of life, integration and a sense of community. Industry stakeholders and organisations are encouraged to be dialogue partners for authorities and research environments by highlighting knowledge needs and innovative practices in urban agriculture.

The government will:

- Produce guidance materials for small-scale urban agriculture[31] and school gardens
- Invite collaboration with immigrant organisations to share knowledge and adapt measures to different food cultures[32]
- Contribute to increased knowledge about urban agriculture through the development of programmes and courses, as well as through informal courses offered by NGOs
- Contribute to research, competence building and innovation on urban agriculture through existing measures and programmes

27 Joint Programming Initiative
28 https://www.cost.eu/actions/TD1106/
29 http://www.urban-agriculture-europe.org/files/130624_barcelona_declaration_on_urban_agriculture.pdf
30 https://ec.europa.eu/newsroom/horizon2020/document.cfm?doc_id=10195
31 This includes composting, the use of fertilizers and alternatives to plant protection products
32 Ref. Norwegian National Action Plan for a Healthier Diet (2017-2023): Healthy diet, meal enjoyment and good health for everyone!

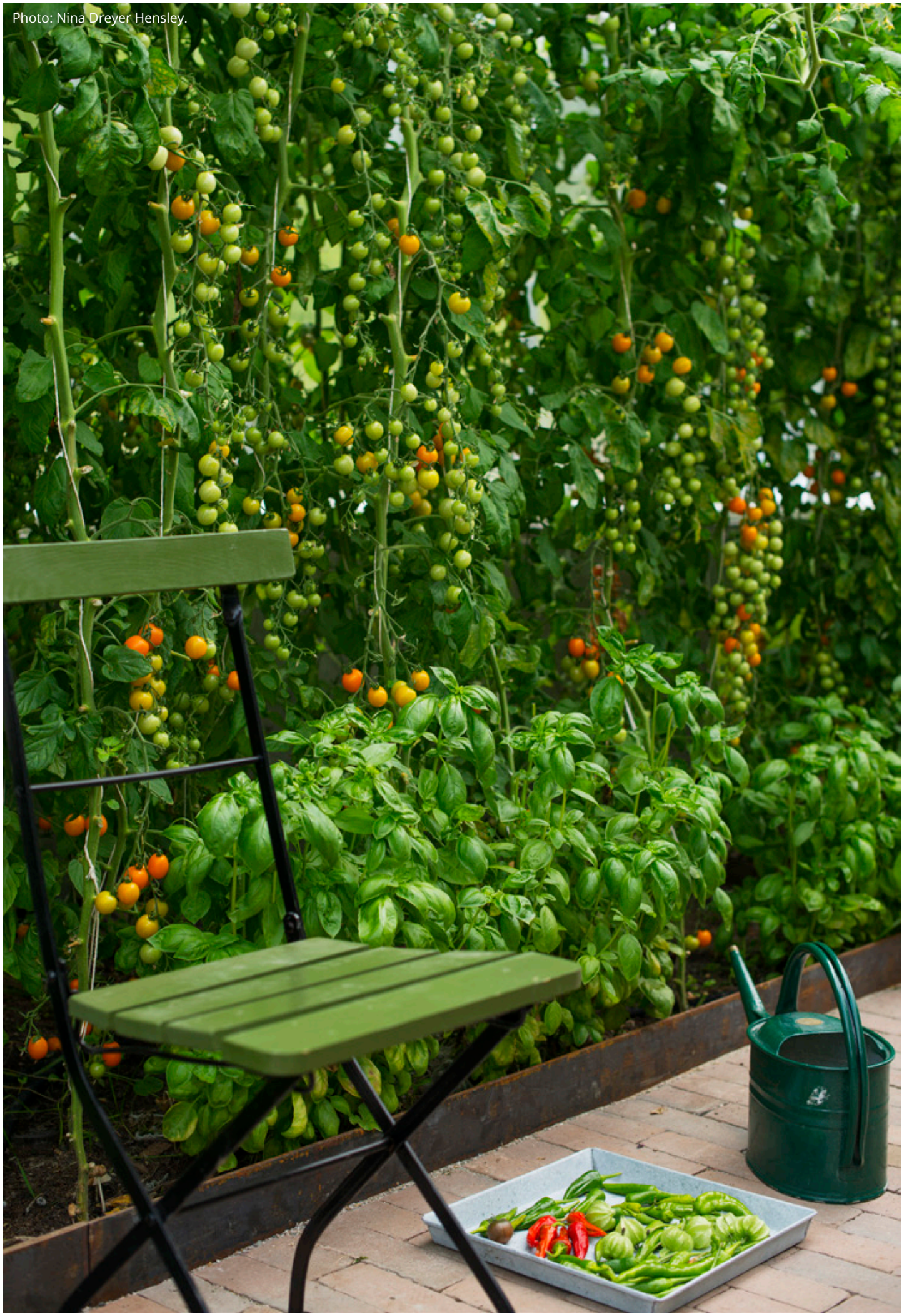


Photo: Nina Dreyer Hensley.

5. INCREASED SUSTAINABLE VALUE CREATION AND BUSINESS DEVELOPMENT

Urban agriculture can help increase sustainable value creation and business development in many areas within both agriculture and other industries. In recent years, we have seen an increase in the commercial exploitation of these opportunities. Cities represent the largest markets for food and a number of other goods and services produced by agriculture.

Urban agriculture facilitates the commercial exploitation of land, buildings and resources that have not previously been used for agriculture or other green purposes. This, together with new cultivation methods and the production of new goods and services for an urban market, can help to boost diversity, innovation and the development of more profitable companies and jobs.

A mutual dependence exists between traditional agricultural production across the country and commercial activities based on urban agriculture and an urban market. The development of greener and profitable agriculture-based enterprises in connection with cities and towns must be based on current agricultural policy objectives.

For the public sector's part, business-oriented measures and municipal and regional authorities can help to facilitate profitable business development, innovation and entrepreneurship within agriculture via various support schemes, risk mitigation measures, advice and good land use planning. The guide *The Farm as a Resource* is intended to help improve the integration of agriculture in regional and local social [33]planning.

5.1 Business development based on urban agriculture

Business development based on agricultural property can occur both in ordinary agricultural production or through the development of urban farming in the form of local food, agriculture-based tourism, 'Green Care', renewable energy production, inputs and other goods and services.

Diverse enterprises, products and markets

Agriculture and the food industry supply the public with food and products from both large-scale and small-scale production. The market is complex and sales to consumers take place via the grocery trade and institutional households (institutions and canteens, hotels, restaurants and catering), as well as via other sales channels. Stated goals include boosting innovation, growth and increasing the market share of Norwegian greenery production. The market share of Norwegian products is currently low and there is potential for increasing it. In connection with this, please see the report on the greenery sector in the lead up to 2035, *Grøntsektoren mot 2035*[34], issued by the advisory committee for innovation and growth in the sector in March 2020.

Sales of local food and beverages have grown significantly in recent years. Total sales of local food and beverages in 2019 were calculated to be NOK 11.3 billion, with NOK 5.3 billion in the grocery trade and NOK 6 billion in the institutional household market[35]. Farmer's Market, Fair Consumption networks, community supported agriculture and other forms of direct sales shorten the distance between producers and consumers and can help to ensure that agriculture produces more of what consumers want. Companies that sell products made from conserved plants and breeds are seeing increasing interest via these channels. For example, *Økologisk Spesialkorn* is a company that sells flour made from spelt, emmer, einkorn, svedjerug and heritage varieties of wheat, and *Guldkolla*, sells products made from Norwegian red polled cattle. This can increase the producer's profits due to fewer intermediaries and may increase the willingness of consumers to pay for products with distinctive characteristics and of known origin. Increasing consumers' knowledge is important for participants in Farmer's Market. These producers know a lot about their products and production, as well as about food traditions and historical processing techniques. They focus heavily on transparency and traceability, such that consumers know where and how the food was produced. All in all, this

33 https://www.regjeringen.no/no/aktuelt/garden-som-ressurs--ny-veileder/id2572735/
34 https://www.regjeringen.no/no/dokumenter/grontsektoren-mot-2035/id2703110/
35 Matmerk.no

can result in those who buy from Farmer's Market having a greater understanding of how the food is produced and what the producers have to do to produce quality food.

Market gardens

A new model for small-scale production for direct sales to a local market has emerged in recent years, the market garden. A partnership between stakeholders in Sweden and Norway is facilitating more profitable, small-scale vegetable growing for local food sales, also known as market gardens. In 2020, Stadsbruk, the Swedish City Farms network, received funding for a three-year project aimed at getting other European countries involved in testing the incubator programme they have developed for establishing local market gardens. The counties of Oslo og Viken, Trøndelag and Vestland in Norway, a city in Switzerland and a city in the Netherlands are taking part. The counties are working to establish a Norwegian 'Stadsbruk' model together with local partners such as municipalities, Innovation Norway, the Norwegian Agricultural Advisory Service, Farmer's Market, City Farmer and upper secondary schools.

The green shift has put the circular economy, bioeconomics and technology on the agenda. Urban agriculture could contribute to more sustainable production methods and better utilisation of residual raw materials, waste and energy that are currently not fed back into the production cycle. Buildings and infrastructure can be designed to facilitate the circular utilisation of plant nutrients, biomass, water and waste heat. Overall, this could result in increased value creation based on resources that are currently being lost.

Food Nation Norway – cooperation on cross-sectoral challenges and opportunities

The strategy for Food Nation Norway (2021) specifies the government's approach to achieving its vision of Norway as a food nation in 2030. The strategy is a common platform for the work on Food Nation Norway, both nationally and regionally, with a view to using all of the resources in the area of food in an efficient and result-oriented manner. The strategy is designed to be of relevance for business development, value creation, health and diet, and to increase pride and the public's engagement in food culture. Developing urban agriculture will help to build the Food Nation Norway.

5.2 Increased diversity in cultivation methods, products and services

In addition to the activity that stems from traditional agriculture, urban agriculture provides a basis for business development based on new market channels and utilising urban spaces in different ways. The market opportunities derive directly from food and food production, as well as green urban and local development and the production of other goods and services. Innovation and entrepreneurship provide opportunities for developing more green and profitable companies and jobs with a multitude of products and production methods.

New commercial cultivation methods

New knowledge and technology are constantly being developed for producing greenery in volume in cities and towns. There is growing interest in using rooftops, cellars and empty industrial buildings for new production methods such as hydroponic, aquaponic and vertical cultivation.

In hydroponic plant cultivation, nutrient availability is optimised, water consumption is lower and the closed production system makes it easier to avoid fungi and pests. The method makes it possible to produce more Norwegian greenery in winter. In aquaponic cultivation systems, aquaculture and plant production take place in an interrelationship. The result enables a mini-ecosystem that reuses nutrients and CO_2. Vertical cultivation involves closed and controlled plant production in a shelf system with artificial lighting, meaning that the cultivation takes places on multiple levels. It is a space efficient method, although it can be energy intensive.

NEW SPACES CAN BE USED FOR COMMERCIAL CULTIVATION

Constructing greenhouses on the roofs of buildings in urban areas is becoming more popular. Greenhouses have been built, and more are planned, on top of existing buildings and new buildings, in both Europe and North America, with good space utilisation and proximity to the market. In August 2020, the world's largest greenhouse (15,000 m^2) was opened on top of a warehouse in Montreal, Canada.[36] This type of commercial cultivation is most relevant in cold climates and may also be suitable in Norway.

36 https://phys.org/news/2020-08-world-biggest-rooftop-greenhouse-montreal.html

DYRK

Photo: Hans Otto Bordvik.

DYRK is a garden sharing marketplace. Rent a nearby garden to cultivate. www.dyrkoslo.no

GRUTEN AS

Photo: Geir Anders Rybakken Ørslien.

Entrepreneurship based on coffee grounds. Production of oyster mushrooms in containers. Urban agriculture can open the way for new products and services within food and agriculture, sustainable urban and local development and within tourism, culture and experiences. www.gruten.no

5.3 Framework conditions and measures

A number measures and initiatives have been established for general business development and agricultural and food production.

The Agricultural Agreement allocates facilitating funds intended to facilitate mobilisation in support of increased value creation based on agricultural resources. These funds are intended to contribute to mobilisation within business development, where the target group is organisations, R&D institutions, the municipal sector and others. At the national level the funds are administered by the Norwegian Agriculture Agency (national facilitation funds) and at the regional level by county authorities (regional facilitation funds).

The Research Council of Norway, Innovation Norway and the Industrial Development Corporation of Norway (SIVA) have further funds for projects within research and innovation, business development and the market.

Agriculture's business-oriented financial programmes in Innovation Norway are designed for investment and business development on agricultural properties. Funds are provided to stimulate business development, innovation and growth, and new products and services for new markets. The largest schemes administered by Innovation Norway in this area are investment and business development funds and funds through the Development Programme.

Additionally, Innovation Norway also administers loan and grant programmes for the business sector in general and contributes advice. For example, support is provided for startups, projects in the bioeconomy, environmental technology and business networks.

Regional and municipal planning provides an important basis for the public sector's facilitation of business development. Several regions and municipalities have seized on urban agriculture in their plans and strategies and are looking at opportunities for business development and partnering with the business sector, NGOs and the general public. Agriculture's trade organisations, which are part of the regional partnerships in the agricultural sector, have also been driving forces.

COMMUNITY SUPPORTED AGRICULTURE

Ødeverp Community Supported Farm, Skotselv. Photo: Kari Mette Høstvik.

Community supported agriculture is a new, exciting model in Norwegian agriculture that ensures the production of Norwegian food and direct contact between agriculture and consumers. The first community supported farm was established in Norway in 2006, at Øverland Farm in Bærum. The number has grown sharply since 2015. As of December 2020, there were 91 community supported farms in Norway. Many community supported farms are very good at organic and social sustainability, although improving the *economic* sustainability of community supported farms is often an important factor. A project focusing on community supported agriculture as a business strategy has developed a planning tool for operating community supported agriculture on andelslandbruk.no.

The government will:

- Encourage increased value creation and business development through measures and its efforts within business-oriented measures, subordinate agencies, county governors, county municipalities and municipalities
- Focus on urban agriculture as part of the work on the Food Nation Norway policy.

Fresh vegetables and local food are sold via Farmer's Market, food festivals and farm outlets. The farmer disseminates knowledge and stories related to the products directly to consumers. Photo: Ministry of Agriculture and Food.


Photo: Ringsaker Association of Rural Women.

6. IMPLEMENTATION AND FOLLOW-UP

Urban agriculture and the strategy's three focus areas touch on several disciplines and several ministries' areas of responsibility. Follow-up of the strategy will be based on current policy in a number of white papers and other policy documents that contain goals urban agriculture can help to achieve.

Cross-sectoral and interdisciplinary cooperation at national, regional and local levels will be emphasised in the implementation of the strategy. Many of the measures will require cooperation between multiple stakeholders. The ministries will follow up the strategy in their areas of responsibility and an official group will be established to ensure cross-sectoral anchoring in the ministries. As part of this, the strategy will, wherever relevant, also be incorporated into the management dialogue relevant ministries have with their underlying agencies.

A good dialogue and cooperation with the municipal sector will be required to achieve the strategy's ambitions. Therefore, the strategy will be followed up through the consultation process with the municipal sector and in the ongoing dialogue between national, regional and local levels. In this context, networks and arenas for highlighting the potential urban agriculture represents for local business and social development will be important.

County governors have established an urban agricultural network for sharing experience and regional learning. At the municipal level, a cross-sectoral partnership on developing and following up local strategies for urban agriculture has proven to be a successful approach. For example, Oslo and Bergen can point to good experience from preparing and following up local strategies. Municipalities can benefit from this experience by developing their own strategies adapted to fit local conditions.

The need for knowledge about urban agriculture will be followed up through research and outreach. The education system, research, local resource centres, the voluntary sector and the business sector could perform various roles in the outreach work.

The strategy will be reviewed after five years and revised if necessary.

The measures discussed in the strategy can be implemented within the current budgetary framework. Administrative costs are not expected to rise.

Volunteering at Århus Farm, Skien. Photo: Hilde Amy Teie.

APPENDIX 1

1. Food safety and other considerations

Food safety, animal and plant health, animal welfare and environmental-friendly health care

Account must be taken of any potential chemical and biological pollution and risks associated with serious plant pests when cultivating in urban environments and recycling water and nutrients.

Urban animal husbandry can entail additional challenges related to animal health and welfare. Where people live closely together, conflicts can also arise in the local community because of, for example, noise, smell or insect problems due to the animal husbandry.

Soil can contain chemical pollutants. Pollutants can especially come from old construction materials and paint, from fossil fuels, from various types of waste and old landfill sites, as well as from incinerators in private homes, industry, hospitals and crematoria. Few of the pollutants accumulate in significant concentrations in plants. Some heavy metals, like cadmium, do accumulate in significant concentrations but they are not among the most relevant pollutants in urban soil. On the other hand, lead and mercury are highly relevant, but they do not accumulate in significant concentrations (VKM 2009). Some heavy metals are also micronutrients (e.g. copper and zinc) and moderately increased uptake of these has no known negative health effects. However, organic and metallic pollutants can contaminate the surfaces of plants and they can be absorbed by, and probably harm, organisms that live in the soil.

Residues from plant protection products can be found if such agents have been used. Approved plant protection products have to be used, and the manufacturer's instructions followed, to ensure that the products are safe.

Infectious agents such as disease causing bacteria and viruses, as well as various parasites, are the other main group of risk factors. The dense populations of people and pets in cities can contribute to the spread of infectious agents and resistant bacteria to food plants and animals in urban agriculture. Anyone who produces food or owns animals has a personal responsibility to prevent infection via food, between animals and between animals and people.

Familiarity with the current requirements of the regulations concerning food hygiene (Food Hygiene Regulations[1]) and the current requirements of the regulations concerning animal health (Regulations on measures against diseases and zoonotic agents in animals[2]) is important.

Small-scale chicken keeping has become popular in urban agriculture, for example in residential areas and kindergartens. Urban poultry keeping without adequate infection control can entail a risk of serious poultry diseases spreading between hobby flocks, and also to commercial poultry keeping. Hobby poultry keeping with access to outdoor areas is particularly vulnerable to infection from wild birds. When hobby poultry and pigeons are imported, the regulations on trading in live animals (Regulations relating to inspection and veterinary checks on import and export of live animals, ova, embryo, semen and animal waste within the EEA and import of live animals from third countries[3]) apply, as do the Regulations on trading in live poultry and hatching eggs in the EEA[4]. The Norwegian Food Safety Authority's website contains a lot of information and guidance about the responsibilities of hobby poultry keepers and others who keep birds such as pigeons, etc.

Plant pests can reduce crops and the quality of products from urban agriculture. Healthy plant materials, including seed, are an important preventive measure together with crop rotation (changing between the crops that are grown in the same place). Since urban agriculture often involves small-scale production, it may be easier to follow up the crops and implement relevant measures early on. The Norwegian Food Safety Authority has published information about the regulations (Regulation related to plants and measures against pests, FOR-2000-12-01-133[5]). Private imports of plants and seeds, including online shopping, are regarded as a risk area with respect to the importation of both invasive species and serious plant pests.

Reduced use of plant protection products

Reducing the use of chemical plant protection products in Norway is a goal, as is reducing the risk of negative

1 https://lovdata.no/dokument/SF/forskrift/2008-12-22-1623
2 https://lovdata.no/dokument/SF/forskrift/2002-06-27-732?q=Forskrift%20om%20tiltak%20mot%20sjukdommer
3 https://lovdata.no/dokument/SF/forskrift/1998-12-31-1484
4 https://lovdata.no/dokument/SF/forskrift/2001-12-28-1616
5 https://lovdata.no/dokument/SF/forskrift/2000-12-01-1333

health and environmental impacts. The agricultural authorities have systematically worked on this over many years, including through action plans and regulations. It is a general requirement that professional users of plant protection products must familiarise themselves, and comply, with the principles for integrated plant protection. Integrated plant protection involves using alternatives to chemical plant protection products wherever possible. It is important that as much professional cultivation in cities and towns as possible avoids the use of chemical plant protection products.

Most plant protection products can only be used by professional users and only a few are allowed to be used in private gardens. It is important to ensure that hobby farmers have access to information about hobby products and alternatives to chemical plant protection. The Norwegian Food Safety Authority has produced information materials on hobby products and alternatives to chemical plant protection aimed at garden owners, and it is important that such information is readily available to private actors who farm in cities and towns. As far as the professional use of plant protection products is concerned, the Plant Protection Product Regulation stipulates several provisions that are intended to reduce the risk in areas accessible to the general public. For example, the use of some plant protection products on plants that border public roads or private gardens and in parks or other publicly accessible areas is prohibited. Signs warning that an area has been sprayed must be posted when these are used in publicly accessible areas.

Biodiversity

cities and towns often have biodiversity that must be safeguarded through conservation or sustainable use. Management intensive habitats such as hayfields in cities may be residual spaces from earlier agriculture. Such areas must be managed properly, for example through adapted haymaking and not using fertilisers, in order to ensure the survival of the rich variety of species in flower meadows and of pollinating insects. A diversity of pollinating insects is important for the pollination of useful and ornamental plants, including in urban areas. It is important to take account of the fact that many wild pollinators are key components of unique communities of diverse species. The government presented a *National Pollinator Strategy* in 2018. This will be followed up by a cross-sectoral action plan for pollinating insects.

Harmful invasive species are considered one of the greatest threats to biodiversity. More trade, globalisation and climate change will increase their spread in the future. Invasive species can establish themselves in residential areas, along roadsides and in industrial areas, and can displace native vegetation and animals or spread infection and diseases that can damage nature and crops. Soil on imported plants can contain harmful invasive organisms, including harmful insects and plant diseases. Harmful invasive plants that have spread from private gardens or public parks represent a growing problem. For example, Japanese knotweed, Lupin and Himalayan balsam are classified as high risk in the Alien Species List[6] and there is a prohibition against planting them. It is expensive and difficult to eliminate them once they have established themselves in natural areas. The responsibilities the various authorities have to implement measures against invasive species are described in an *action plan for harmful invasive organisms covering 2020-2025*.

Green infrastructure

The quality of habitats describes the extent to which landscape areas fulfil important ecological functions for species, such as being a source of food resources, nesting sites, relevant mates and protection against being eaten. High-quality areas must also be accessible to maintain this ecological functionality. In other words, the areas must be connected to each other, for example through corridors that species can use to move between them. It is important for a city's birdlife that there is access to large trees, and trees and shrubs that produce berries and seeds. For insects, it is important to prioritise plants that produce flowers rather than grass and other wind-pollinated plants. It is important to use indigenous species that cannot spread and displace local vegetation elsewhere.

The network of high-quality areas, which is also connected to other important areas so that the species can move between them, is called 'green infrastructure'. Green infrastructure has become a key concept for describing the quality and accessibility of landscape areas.

Researchers at the Norwegian Institute for Nature Research (NINA) have developed a tool for modelling green infrastructure viewed in the context of the overall strain from human activity.[7] The results are maps showing the network of corridors and areas that fulfil important functions for species, and which can also be used to work out the consequences of land development and identify the best areas for restoration. The maps can be used in the planning of multifunctional green spaces in cities and towns.

Conserved plants and domesticated animals

Urban agriculture provides more opportunities for cultivating a more diverse range of varieties such that conserved plants are conserved through active use.

6 https://www.artsdatabanken.no/fremmedartslista2018
7 NINA Report 1625: Modelling green infrastructure for conservation and land planning – a pilot study.

Small areas of land, which are often managed more manually and organically, are highly suitable for growing such varieties. Urban chicken keeping may be suitable for conserved breeds. Protecting genetic diversity through active use makes food production more resilient against disease and climate change and helps to ensure a genetic reservoir that is important for future plant and livestock breeding. In this way, urban agriculture can play a part in the implementation of the *National Strategy for Conservation and Sustainable Use of Genetic Resources for Food and Agriculture* established by the Ministry of Agriculture and Food in 2019.

Cultural environments

Cities and towns contain traces of history in the form of their street network, property structure, buildings and building environments. It is important that historical urban environments and landscapes are taken into account such that their distinctive character and assets worth preserving are safeguarded. Some cultural monuments/cultural environments may be protected under the Cultural Heritage Act, zoned for conservation through the Planning and Building Act and/or identified as worthy of protection in a cultural heritage plan. These can provide guidelines for the placement and design of urban agriculture. It is, therefore, important to engage in dialogue with those who administer the cultural environment when planning measures that may impact cultural environmental interests.

Public health

Urban agriculture contributes *to the implementation of the Norwegian Action Plan for Physical Activity (2020-2029)*.[8] Urban agriculture can provide societal benefits in a number of areas, including physical health and quality of life, through opportunities for outdoor experiences and physical activity, as well as a sense of community that spans age and ethnic groups.

Urban agriculture can also provide societal benefits in other areas related to public health such as nutrition and better knowledge about the relationship between diet and health, and thus contribute to the implementation of the *Norwegian National Action Plan for a Healthier Diet (2017-2021).* A decision has been made to extend the action plan to 2023.

Soil, soil health and cultivation media

Urban agriculture relies on good soil to produce sustainable and healthy food. *A national programme for soil health*[9] was presented in the spring of 2020. Good soil health means that the soil's physical, chemical and biological components work together in the best possible way, both for production and for other soil functions.

Soil health entails a greater focus on the life in the soil, organic materials and soil structure. Soil with a good structure has a good water balance and greater capacity for storing carbon and reducing pollution emissions into water and air and provides the best conditions for plant growth. Good soil structure depends on versatile and active soil life and, for most soil types, also a certain content of organic material.

Cultivation media and soil improvement agents must ensure good plant growth. Reducing the use of peat in soil used for cultivation is also a goal, mainly because peat extraction releases CO_2, but also because it can lead to a loss of biodiversity and ecosystem services such as flood mitigation. There are substitute products on the market today, and new ones are under development. Different users have different requirements concerning the cultivation medium and mixtures of substitute products must therefore be adapted to their desired application. One must also take account of the environmental consequences of the substitute materials. There is a need to further develop other soil products based on organic waste as part of the circular economy, business development and climate and environmental measures. Urban agriculture can encourage this work through product and knowledge development, as well as by demanding soil products that have less climate and environmental impact than peat.[10]

Composting

Various types of organic waste, such as garden and kitchen waste, can be composted or fermented to return nutrients and carbon to the soil. Composting can be done on any scale, from home composting to large intermunicipal facilities. The current regulations for fertilisers, etc. of organic origin are aimed at commercial stakeholders, and what is defined as home compost and using one's own food waste in one's garden are exempt from the scope of application of the Regulations. Nevertheless, local authorities may have regulations that regulate such activities based on infection control considerations, the potential for rat infestations, etc. The Norwegian Food Safety Authority is working on a *guide to the regulations for composting targeted at restaurants, canteens and jointly owned properties and will publish online information for private individuals*.

Only what cannot be eaten by humans is regarded as food waste. Reducing the amount of food waste is also a goal. The best means of using food waste that cannot be used as animal feed is through composting or biogas[11].

8 https://www.regjeringen.no/contentassets/43934b653c924ed7816fa16cd1e8e523/handlingsplan-for-fysisk-aktivitet-2020.pdf
9 https://www.landbruksdirektoratet.no/no/miljo-og-okologisk/jordbruk-og-miljo/nasjonalt-miljoprogram/publikasjoner/nasjonalt-program-for-jordhelse.rapport-nr-3-2020
10 https://www.miljodirektoratet.no/publikasjoner/2020/april-2020/forslag-til-plan-for-overgang-fra-bruk-av-torvbaserte-til-torvfrie-produkter/
11 https://www.miljodirektoratet.no/globalassets/publikasjoner/klif2/publikasjoner/2957/ta2957.pdf

2. White papers, regulations, strategies and action plans of relevance for urban agriculture

Overview of relevant white papers

- Meld. St. 13 (2020-2021) Report to the Storting (white paper) – Climate Action Plan for 2021-2030
- Meld. St. 16 (2019-2020) Report to the Storting (white paper) – New goals for Norway's cultural environment policy
- Meld. St. 6 (2019–2020) Report to the Storting (white paper) – Early intervention and inclusive education in kindergartens, schools and out-of-school-hours care
- Meld. St. 19 (2018-2019) Report to the Storting (white paper) – Public Health Report – A Good Life in a Safe Society
- Meld. St. 15 (2017–2018) Report to the Storting (white paper) – A full life – all your life — A Quality Reform for Older Persons
- Meld. St. 18 (2016–2017) Report to the Storting (white paper) – Urban sustainability and rural strength
- Meld. St. 11 (2016–2017) Report to the Storting (white paper) – Change and development – A future-oriented agricultural production
- Meld. St. 14 (2015-2016) Report to the Storting (white paper) – Nature for life – Norway's national biodiversity action plan
- Meld. St. 30 (2015–2016) Report to the Storting (white paper) – From reception centre to the labour market – an effective integration policy
- Meld. St. 31 (2014-2015) Report to the Storting (white paper) – The garden as a resource – the market as a goal – Growth and entrepreneurship in agricultural industries

Overview of key Acts

- Food Act
- Animal Welfare Act
- Mental Health Act
- Planning and Building Act
- Nature Diversity Act
- Cultural Heritage Act

Overview of relevant Regulations

- Regulations on measures against diseases and zoonotic agents in animals
- Regulations on trading in live poultry and hatching eggs in the EEA
- Regulation related to plants and measures against pests
- Plant Protection Product Regulation
- Regulations on invasive organisms
- Regulations for fertilizer products, etc. of organic origin
- Food Hygiene Regulations
- Regulations on environmental-friendly health care
- Regulations relating to inspection and veterinary checks on import and export of live animals, ova, embryo, semen and animal waste within the EEA and import of live animals from third countries

Overview of strategies and action plans

- Strategy for Food Nation Norway
- Norwegian Action Plan for Physical Activity (2020-2029)
- Norwegian National Action Plan for a Healthier Diet (2017-2023): Healthy diet, meal enjoyment and good health for everyone!
- Action plan on reducing risk connected to the use of pesticides
- Action plan for harmful invasive organisms
- National Pollinator Strategy
- National Strategy for Conservation and Sustainable Use of Genetic Resources for Food and Agriculture

APPENDIX 2

Examples of expert environments within urban agriculture

The Nursery, Bygdø Royal Farm in Oslo	https://bygdokongsgard.no/gartneriet
Voll Farm in Trondheim	https://vollgard.no/
Linderud Farm in Oslo	https://mia.no/linderud
Århus Farm in Skien	www.aarhusgaard.no
Ullandhaug Organic Farm, Stavanger	http://www.ullandhaug-gard.no/
Holt Ecopark, Tromsø	https://www.schoolandcollegelistings.com/XX/Unknown/212071085563082/Holt-l%C3%A6ringstun
Norges Skolehagelag	http://norgesskolehagelag.no/index.html?fbclid=IwAR2gb-uf66LY_ZuwDGvocfufuPmw1EsWaeHeotNu-4c3skGvpfILGhe
Dyrk Framtida – more school gardens in Norway	https://okologisknorge.no/prosjekter/dyrk-framtida-flere-skolehager-i-norge/
Geitmyra Culinary Centre for Children	https://www.geitmyra.no/
Oslo municipal school gardens	https://www.geitmyraskolehage.no/skolehagene
Losæter – City Farmer in Oslo	Losæter – Welcome to a summer mountain pasture in the centre of the city! (loseter.no)
City Farmer in Bergen	Contact – CITY FARMER (bybondenibergen.no)
Neighbourhood Gardens	https://nabolagshager.no/
Hagecrew	https://www.hagecrew.no/
Dyrk	https://www.dyrk.no
Tana upper secondary school	Tana upper secondary school
Horticultural schools	
Norwegian Centre for Organic Agriculture, NORSØK	https://www.norsok.no/
National Centre for Urban Agriculture, NMBU	National Centre for Urban Agriculture | NMBU
The Science Park in Ås	https://vitenparken.no/skolehage/
Norwegian Institute of Bioeconomy Research (NIBIO)	https://www.nibio.no/
Norwegian Genetic Resource Centre, NIBIO	Norwegian Genetic Resource Centre, NIBIO
KVANN	K V A N N – Norwegian Seed Savers
Norwegian Agricultural Advisory Service	https://www.nlr.no/
County governor	https://www.statsforvalteren.no/

Published by:
Norwegian Ministry of Agriculture and Food, Norwegian Ministry of Climate and Environment, Norwegian Ministry of Local Government and Modernisation, Norwegian Ministry of Transport and Communications, Norwegian Ministry of Defence, Norwegian Ministry of Education and Research and Norwegian Ministry of Petroleum and Energy

Publications are available on:
www.government.no
Publication number: M-0755 E
Design and layout: Konsis Grafisk AS
Front cover: Pallet frames in the Møhlenpris district of Bergen. Photo: Frøydis Lindén
Back cover: Lettuce growing in the market garden of Sogn School of Organic Agriculture and Horticulture. Photo: Frøydis Lindén